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OCCUPATIONAL WAGE RELATIONSHIPS

SERIES 1
NO. 1

MACHINERY

1945

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WAGE STRUCTURE DIVISION
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OCCUPATIONAL WAGE RELATIONSHIPS

MACHINERY

FOREWORD

The composition of the labor force in many industries and the relationship of wages paid to different occupational groups have undergone important changes during the war. In the change-over to peacetime production employers and labor unions will be faced with difficult problems in planning wage scales for new occupations and products. It is believed that information showing the relationship of wage rates among occupations representative of the wide range of skills and wages in leading industries, will be of general usefulness in dealing with such emergent problems. This series of studies is designed with that purpose in mind. A second series of studies to be published shortly will present occupational wage rates, in money terms, with detail by size of establishment, city, region, unionization and method of wage payment. In addition, the distribution of employment by occupations will be available for the same industries covered in the present and second series of studies.

OCCUPATIONAL WAGE RELATIONSHIPS [1]

GENERAL INTRODUCTION

In recent years many industries have experienced marked changes in the organization of production due to the shift from the manufacture of peacetime goods to products needed by the armed forces. In non-war goods industries the organization of production has been altered in varying degree by increased output, new types of materials, new processes and scarcity of experienced workers. The employment of workers with little or no prior industrial experience has necessitated the simplification and breaking up of many jobs formerly performed by fewer workers. These factors have caused changes in the composition of the labor force and have affected the occupational structure of many industries.

It is reasonable to assume that if post-war production is maintained at a fairly high level, the wartime subdivision of labor will be retained in fair measure in many industries. The adaptation of the new technology and improved methods of organization to the manufacture of peacetime products will, however, require a reexamination of wage rates for existing occupational groups; in many industries new wage scales may have to be formulated for new occupations and new products.

For these purposes, it is believed that information showing the current occupational wage pattern in leading industries will be of assistance to management and labor in wage administration and in collective bargaining. It should also be useful to government agencies concerned with wage stabilization and the placement of war veterans and dislocated war workers. The occupational wage relationships presented in this series of studies are believed representative of an industry at the time of the survey. It may be emphasized that the data do not necessarily reflect any normal, proper or ideal relationship of wages among different occupational groups.

This series of studies will present for selected industries on a Nation-wide basis indexes of wage rates in key occupations. [2] The indexes are constructed from wage data collected in connection with the Bureau's Industry Wage Study program. The purpose of these indexes is to show the spread between the wages of the various key occupations and wages of an unskilled occupation, used as a base. From these figures it is also possible, as indicated below, to measure the wage differential among any of the key occupations.

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[1] This report was prepared by Carrie Glasser with the assistance of Toivo P. Kanninen. The field work for this survey was under the direction of the Regional Wage Analysts in the Bureau's regional offices.

[2] Occupational wage rates, in money terms, with detail by size of establishment, city, region, unionization and method of wage payment, will be the subject of other studies to be issued in the near future. Statistics showing the distribution of employment among occupational groups will be presented in a third series of reports. For the most part the three series will deal with the same industries.

The key occupations chosen for analysis are representative of a wide range of skills and wages and account for the bulk of the labor force in specific industries or groups of related industries. These occupations also reflect the various processes employed by firms of different sizes throughout the country. The classification of workers in accordance with job descriptions developed by the Bureau is performed by trained field workers. [3]

It is important to point out that some of the key occupations are not common to all firms but are found in only certain sectors of the industry. For example, in the machinery group some of the establishments are integrated to the extent that they operate their own foundries. In most machinery establishments, however, foundry work is contracted out to independent foundries, which constitute a separate industry. The wages paid to "captive" foundry occupations in the machinery industry and the relationship of these wages to the general wage scale in that industry may not, therefore, be typical of wage relationships in the independent foundry industry. [4]

The "base occupation" with which wage comparisons will be made will, in most cases, be a representative unskilled occupation (or combination of occupations) near the bottom of the wage scale in the given industry. Thus the ladder-like pattern of wages for the different key occupations will be reflected clearly. In the interest of uniformity the Bureau will use, wherever appropriate, the weighted average wage of male janitors and hand truckers as a base. Where this is not feasible a single unskilled occupation may be employed for this purpose.

The selection of the base occupation (or occupations) is guided by the following considerations: Definiteness of job title, high degree of uniformity in job content throughout the industry, and the presence of that job in most establishments and localities in the industry studied. Occupations typically paid on an incentive basis are intentionally avoided. The classification "common labor" is not used because the meaning and content of this job varies considerably within any single industry or group of industries.

HOW TO USE THE INDEXES

Suppose in City X the weighted hourly rate for male janitors and hand truckers is 85 cents. The "base" is then 85 cents, which is arbitrarily assigned an index of 100. If tool and die makers in the same city receive $1.70 on the average, the city index for this occupation is then 200 ($1.70 divided by 85 cents and multiplied by 100). The national index for tool and die makers is found by selecting (without weighting) the median of all city indexes for this occupation. If City X happens to be the median city, the national index for tool and die makers would then be 200, or 100 percent above the base wage. Half the remaining cities show a somewhat higher and half a somewhat lower index for tool and die makers.

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[3] Job descriptions employed in these surveys are available upon request.

[4] The occupational structure, wages, and wage relationships in independent foundries will be the subject of a separate report.

For all key occupations the national indexes are chosen in the same fashion. These indexes make it possible not only to ascertain the wage relationship of a particular occupation to the base, as noted above, but also the relationship of any one key occupation to another. For example, suppose the national wage index for production machinists is 175 or 75 percent above the base wage. To determine the relation between wage rates of production machinists and tool and die makers, the two indexes may be compared in percentage terms. This hypothetical illustration would indicate that tool and die makers' wage rates are, on the average, 14.3 percent higher than those of production machinists (200 divided by 175). It should be noted that the difference between the indexes is not stated in terms of cents per hour.

The occupational wage indexes in a Nation-wide basis should be used cautiously and should be interpreted only as a reflection of a central tendency or concentration within an industry. In particular localities and in certain sections of an industry the relationship of wage rates for the key occupations may not conform strictly with the National indexes shown. 5/ In order to make the use of these indexes more flexible and adaptable to the needs of particular situations, particularly for use in collective bargaining, the Bureau will also present in these series data which show the range within which half of the city indexes fall. For example, in the machinery group 50 cities reported wage data for engine-lathe operators, Class B; the national or median index was found to be 136. For half of these cities, or 25 out of 50, the indexes fall within the range 127 - 151. In using the median index for this occupation, therefore, it is important to recognize the spread of 24 index points within which half the city relatives were found.

5/ For certain industries the median indexes for the key occupations will be presented on a regional as well as on a Nation-wide basis. Data of this sort are provided in the present report on the machinery industries.

OCCUPATIONAL WAGE RELATIONSHIPS IN MACHINERY INDUSTRIES
JANUARY 1945

The machinery group as presently defined includes establishments manufacturing machinery, other than machine tools, machine-tool accessories and electrical machinery. 6/ Products manufactured in the group include engines and turbines, agricultural, mining, metalworking and construction machinery, office, store, household and service-industry machines and special machinery, other than metalworking machinery. Processing operations commonly found in the manufacture of these products are machining, stamping and forming, casting, welding, surface coating, assembling and inspection. Plant and equipment maintenance, material movement and custodial workers are typical of other occupational groups employed in such establishments. Because of the similarity in processes used, the composition of the labor force in the machinery industries is believed sufficiently comparable to permit a grouping of these industries for the study of wages.

The data are based on pay-roll reports for January 1945 from 1,090 establishments in 55 cities. 7/ Approximately 230,000 workers representing about 20 percent of total employment in the industry were in the covered establishments. For male workers 63 key jobs were studied and for female workers 15. Not all of these occupations appeared in every city because of differences in the composition of the labor force in different establishments. The smallest number of cities reporting data for a key occupation covering all male workers was 21; for male time workers the smallest coverage was 18 cities. The corresponding minimum coverage for all female workers was 19 cities and for female time workers, 13 cities.

6/ The group is limited to Industry Group 35 "Miscellaneous Machinery" excluding industries coded 3541 and 3543, as defined in the Standard Industrial Classification.

7/ The number of cities classified by region are: New England, 8; Middle Atlantic, 6; Southeastern, 6; Great Lakes, 17; Southwestern, 4; Middle West, 2; Mountain and Pacific, 7; and Border States, 5. A listing of the cities by name will be found in Table 3. Because of the delay in receiving returns from Chicago, this city has not been included. A review of the material from Chicago, however, indicates that the findings of this study are not appreciably affected by the omission of this city.

NATION-WIDE RELATIONSHIPS

Table 1 shows for each key male and female occupation in the machinery industry group the median index of straight-time average hourly earnings for all workers; separate indexes appear for workers paid exclusively on a time basis. The indexes were derived as follows: (1) in each city the weighted average wage of male janitors and hand truckers was used as a base (100); (2) the wages of other key occupations in each city were related to the base wage in terms of percentages or index numbers; (3) the median of all the city indexes for each occupation was chosen to represent the national average. In order to indicate the degree of variation within each occupation, table 1 shows the index range within which half of the cities fall. It is important to note the difference in the base used in deriving the indexes for time workers and all workers. The base for time workers was limited to male janitors and hand truckers paid only on a time basis; for all workers, the base included a few janitors and hand truckers paid on an incentive basis.

These indexes are constructed to show for the industry on a Nation-wide basis, the step-like arrangement of wages in different occupations. Attention is focussed primarily on the spread in wages between occupations requiring varying degrees of skill and the base occupations which are unskilled. The differentials in wages with respect to the base rather than the actual wages for any particular group are, therefore, highlighted by these indexes.

The arrangement or ranking of the male occupations for workers paid on a time basis is shown graphically in Chart 1. The degree of inter-city variation for each occupation is also indicated by the identification of the range within which half of the reporting cities fall. It will be observed that tool and die makers and wood patternmakers rank highest with wage rates 71 percent and 75 percent, respectively, above the base. The descending order of occupational wage rates is clearly evident with watchmen showing the lowest rates, 10 percent below the base.

The indexes for female occupations are constructed by using the same base as for male occupations, that is, the average wage of male janitors and hand truckers. Although the number of occupations where women are employed are fewer than the number employing men, there are noticeable differentials among them and in relation to the base. Grinding machine operators (Class B) appeared to be the highest-paid female occupation included in these key jobs, and janitresses the lowest. The median index for the lowest-paid female occupation was practically the same as for watchmen, the lowest male occupation (89 compared to 90 for time workers).

The method of wage payment appears to affect the level of the indexes in a significant fashion but the relationship of wages in the different occupations is practically the same for all workers (time and incentive combined) and time workers alone. Chart 2 illustrates this point for a selected number of key occupations. It will be observed that although the indexes for time workers are generally lower, the ranking of the occupations in the two lists is similar.

Table 1.--INDEXES OF AVERAGE HOURLY EARNINGS FOR KEY OCCUPATIONS IN MACHINERY INDUSTRIES,[1] BY SEX, FOR ALL WORKERS, AND TIME WORKERS SEPARATELY, JANUARY 1945

(Indexes for each occupation derived from city relatives based on weighted average for male janitors and hand truckers.)

Sex, occupation, and class (1)	All workers			Time workers		
	Number of cities reporting (2)	Median index (3)	Index range within which one-half of the city indexes fell (4)	Number of cities reporting (5)	Median index (6)	Index range within which one-half of the city indexes fell (7)
MALES						
Maintenance						
Carpenters, maintenance	43	139	130 - 147	43	140	134 - 147
Electricians, maintenance	48	149	141 - 158	48	152	141 - 159
Machinists, maintenance	44	154	144 - 166	44	156	145 - 170
Maintenance men, general utility	45	134	125 - 148	45	134	128 - 148
Mechanics, maintenance	36	144	134 - 153	36	145	134 - 153
Millwrights	38	140	134 - 150	38	143	136 - 151
Patternmakers, wood	33	174	168 - 187	32	175	171 - 190
Supervision						
Working foremen, processing departments	55	166	152 - 186	55	163	153 - 184
Processing						
Machining, Assembling, etc.						
Assemblers, Class A	49	149	139 - 159	49	144	137 - 159
Assemblers, Class B	51	131	125 - 142	51	128	117 - 137
Assemblers, Class C	51	114	106 - 126	51	111	103 - 118
Chippers and grinders	50	120	113 - 127	49	113	105 - 120
Drill-press operators, radial, Class A	43	145	133 - 157	43	140	129 - 156
Drill-press operators, radial, Class B	47	130	122 - 141	46	127	117 - 133
Drill-press operators, radial, Class C	35	113	108 - 129	33	112	105 - 119

Table 1.--INDEXES OF AVERAGE HOURLY EARNINGS FOR KEY OCCUPATIONS IN MACHINERY INDUSTRIES, BY SEX, FOR ALL WORKERS, AND TIME WORKERS SEPARATELY, JANUARY 1945 - Continued 1/

Sex, occupation, and class (1)	All workers: Number of cities reporting (2)	All workers: Median index (3)	All workers: Index range within which one-half of the city indexes fell (4)	Time workers: Number of cities reporting (5)	Time workers: Median index (6)	Time workers: Index range within which one-half of the city indexes fell (7)
MALES - Processing (Continued)						
Drill-press operators, single and multiple spindle, Class A	39	142	133 - 151	35	138	133 - 144
Drill-press operators, single and multiple spindle, Class B	47	126	118 - 139	45	121	113 - 125
Drill-press operators, single and multiple spindle, Class C	47	108	101 - 118	45	105	100 - 112
Engine-lathe operators, Class A	51	156	143 - 183	51	151	142 - 182
Engine-lathe operators, Class B	50	136	127 - 151	50	133	126 - 149
Engine-lathe operators, Class C	45	116	105 - 126	43	110	101 - 121
Grinding-machine operators, Class A	44	156	147 - 168	43	154	144 - 167
Grinding-machine operators, Class B	44	138	131 - 147	43	130	121 - 138
Grinding-machine operators, Class C	36	118	112 - 133	35	113	104 - 117
Heat treaters, Class A	31	149	135 - 159	29	145	134 - 158
Heat treaters, Class B	30	127	115 - 142	28	126	116 - 134
Machine-tool operators, miscellaneous machines	53	139	129 - 154	52	135	128 - 154
Machinists, production	51	159	149 - 179	51	158	149 - 180
Milling-machine operators, Class A	45	153	143 - 169	44	150	140 - 164
Milling-machine operators, Class B	49	140	129 - 148	48	132	125 - 142
Milling-machine operators, Class C	41	116	110 - 127	39	111	106 - 116
Painters, finish	36	132	122 - 138	35	130	122 - 138
Painters, rough	51	121	110 - 133	51	113	108 - 129
Screw-machine operators, automatic, Class A	33	161	151 - 178	27	157	149 - 164
Screw-machine operators, automatic, Class B	32	139	133 - 151	26	135	122 - 140
Screw-machine operators, automatic, Class C	28	122	111 - 133	23	113	109 - 129
Set-up men, machine tools	44	158	145 - 168	43	158	146 - 165

Table 1.--INDEXES OF AVERAGE HOURLY EARNINGS FOR KEY OCCUPATIONS IN MACHINERY INDUSTRIES,[1/] BY SEX, FOR ALL WORKERS, AND TIME WORKERS SEPARATELY, JANUARY 1945 - Continued

Sex, occupation, and class (1)	All workers: Number of cities reporting (2)	All workers: Median index (3)	All workers: Index range within which one-half of the city indexes fell (4)	Time workers: Number of cities reporting (5)	Time workers: Median index (6)	Time workers: Index range within which one-half of the city indexes fell (7)
MALES - Processing (Continued)						
Tool and die makers	54	171	161 - 190	54	171	162 - 188
Turret-lathe operators, hand (including hand screw machine) Class A	48	155	144 - 169	49	151	139 - 164
Turret-lathe operators, hand (including hand screw machine) Class B	51	137	127 - 148	51	129	121 - 142
Turret-lathe operators, hand (including hand screw machine) Class C	47	120	109 - 133	45	113	107 - 120
Welders, hand, Class A	54	155	145 - 180	54	151	143 - 172
Welders, hand, Class B	52	139	132 - 161	50	133	123 - 152
Welders, machine, Class A	25	141	129 - 171	22	143	134 - 169
Welders, machine, Class B	26	132	123 - 144	20	131	122 - 140
Founding						
Coremakers, hand	43	153	138 - 175	40	147	137 - 167
Molders, hand, bench	37	156	145 - 174	32	154	137 - 162
Molders, floor	41	156	139 - 182	39	148	139 - 178
Molders, machine	36	158	140 - 185	28	140	130 - 157
Sand mixers, hand and machine	35	112	105 - 120	32	109	103 - 116
Stamping and Forming						
Punch-press operators, Class A	25	137	121 - 145	19	124	118 - 137
Punch-press operators, Class B	33	127	117 - 131	29	115	107 - 129
Sheet-metal operators, miscellaneous machines	23	136	125 - 145	18	138	129 - 148
Sheet-metal workers, production	21	148	136 - 155	22	146	132 - 153

Table 1.--INDEXES OF AVERAGE HOURLY EARNINGS FOR KEY OCCUPATIONS IN MACHINERY INDUSTRIES,[1/] BY SEX, FOR ALL WORKERS, AND TIME WORKERS SEPARATELY, JANUARY 1945 - Continued

Sex, occupation, and class (1)	All workers: Number of cities reporting (2)	All workers: Median index (3)	All workers: Index range within which one-half of the city indexes fell (4)	Time workers: Number of cities reporting (5)	Time workers: Median index (6)	Time workers: Index range within which one-half of the city indexes fell (7)
MALES - (Continued)						
Inspection and Testing						
Inspectors, Class A	43	152	141 - 164	43	152	144 - 164
Inspectors, Class B	45	133	124 - 141	45	133	124 - 141
Inspectors, Class C	43	113	107 - 117	42	112	106 - 117
Recording and Control						
Stock clerks	53	114	107 - 127	53	115	110 - 127
Material Movement						
Crane operators, electric bridge	42	121	114 - 133	42	122	114 - 132
Truck drivers	53	116	107 - 121	53	116	109 - 120
Truckers, power	38	112	105 - 118	38	112	107 - 118
Custodial						
Guards	43	108	103 - 115	41	109	103 - 115
Watchmen	53	90	85 - 96	53	90	87 - 97
FEMALES						
Processing						
Machining, Assembling, etc.						
Assemblers, Class B	35	114	102 - 129	28	108	100 - 123
Assemblers, Class C	41	104	94 - 119	39	94	90 - 107

Table 1.--INDEXES OF AVERAGE HOURLY EARNINGS FOR KEY OCCUPATIONS IN MACHINERY INDUSTRIES,[1/] BY SEX, FOR ALL WORKERS, AND TIME WORKERS SEPARATELY, JANUARY 1945 - Concluded

Sex, occupation, and class (1)	All workers: Number of cities reporting (2)	All workers: Median index (3)	All workers: Index range within which one-half of the city indexes fell (4)	Time workers: Number of cities reporting (5)	Time workers: Median index (6)	Time workers: Index range within which one-half of the city indexes fell (7)
FEMALES - Processing (Continued)						
Drill-press operators, single and multiple spindle, Class B	27	118	114 - 132	21	117	106 - 122
Drill-press operators, single and multiple spindle, Class C	41	99	92 - 109	39	96	92 - 104
Grinding-machine operators, Class B	27	130	117 - 147	22	125	115 - 134
Grinding-machine operators, Class C	31	111	100 - 124	26	107	98 - 111
Milling-machine operators, Class B	19	122	115 - 133	13	122	117 - 133
Milling-machine operators, Class C	27	107	97 - 118	23	98	96 - 109
Turret-lathe operators, hand (including hand-screw machine) Class B	24	123	121 - 140	19	123	117 - 133
Turret-lathe operators, hand (including hand-screw machine) Class C	33	112	105 - 118	27	110	104 - 114
Stamping and Forming						
Punch-press operators, Class B	24	111	96 - 118	14	96	86 - 107
Inspection and Testing						
Inspectors, Class B	34	118	104 - 129	34	119	110 - 132
Inspectors, Class C	41	100	96 - 107	42	99	93 - 109
Recording and Control						
Stock clerks	35	99	88 - 110	35	99	88 - 110
Custodial						
Janitresses	33	88	81 - 92	33	89	84 - 93

[1/] Standard Industrial Classification Industry Group 35, Machinery (Except Electrical), with the exception of sub-groups coded 3541 and 3543.

In 54 occupations listed in table 1 (44 male and 10 female) the indexes for all workers (time and incentive workers combined) exceeded the indexes for time workers alone. The greatest differences were found in those occupations that typically employ a large proportion of workers on an incentive basis. Female assemblers, Class C, male automatic-screw-machine operators, Class C, and male punch-press operators, Class A and B are representative of occupations where the spread in indexes between all workers and time workers only was greatest.

In only 2 female and 11 male occupations were the indexes of time workers higher than those of all workers. Because a larger number of workers in the base occupation than in these occupations were paid on an incentive basis, earnings in the base were lower by a proportionately greater amount. This had the effect of raising the indexes for a few occupations. Carpenters, electricians, and custodial workers are typical of the groups so affected.

The statistics in table 1 also permit an interesting comparison of the relationship of straight-time wage rates among male and female workers engaged in the same occupations. In 14 key occupations where both men and women are employed the indexes for male time workers exceeded those for female time workers. This situation reflects primarily the differences in pay scales of men and women engaged in the same kind of work, although minor differences in job content may also be partly responsible. 8/ The spread was greatest among assemblers, Class B (20 index points) and smallest among turret-lathe operators, Class C (3 points). It is also notable that in none of these 14 occupations did the median index for males fall below 100, the base. For 6 female occupations the medians were one to six index points lower than the base. Chart 3 illustrates for all workers and time workers separately, the difference in indexes for men and women engaged in five key occupations.

REGIONAL VARIATIONS

The relationship of wages among the key occupations on a regional basis is shown in table 2 which presents the indexes for time workers alone in the Northeast, South, Great Lakes Region and the West. The indexes for each occupation represent the medians of all cities where that occupation was reported.

The ladder-like arrangement of occupations according to these indexes in 3 regions (Northeast, West and Great Lakes) is closely similar and only in the South are significant differences apparent. To illustrate, when the indexes for the male occupations were ranked from high to low in the Northeast, West and Great Lakes areas separately, it was found that for 23 of

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8/ Sex differences in wage rates usually reflect the wage policies of different establishments, some of which employ men and some women in a given job. Men and women workers are rarely employed at the same job for different rates within a single establishment.

Table 2.--INDEXES OF AVERAGE HOURLY EARNINGS FOR TIME WORKERS IN KEY OCCUPATIONS IN MACHINERY INDUSTRIES, BY SEX, AND REGION, JANUARY 1945

(Indexes for each occupation derived from city relatives based on weighted average wage for male janitors and hand truckers.)

Sex, occupation and class (1)	Median index				
	United States (2)	North-east (3)	South (4)	Great Lakes (5)	West (6)
MALES					
Maintenance					
Carpenters, maintenance	140	136	161	136	140
Electricians, maintenance	152	144	204	144	155
Machinists, maintenance	156	147	206	157	148
Maintenance men, general utility	134	134	152	132	133
Mechanics, maintenance	145	133	185	147	144
Millwrights	143	136	159	145	(1)
Patternmakers, wood	175	171	202	172	174
Supervision					
Working foremen, processing departments	163	162	205	153	162
Processing					
Machining, Assembling, etc.					
Assemblers, Class A	144	141	186	142	141
Assemblers, Class B	128	124	148	125	119
Assemblers, Class C	111	107	120	107	121
Chippers and grinders	113	109	117	114	114
Drill-press operators, radial, Class A	140	134	170	137	135
Drill-press operators, radial, Class B	127	117	142	127	126
Drill-press operators, radial, Class C	112	105	119	113	114
Drill-press operators, single and multiple spindle, Class A	138	137	146	136	127
Drill-press operators, single and multiple spindle, Class B	121	118	135	120	119
Drill-press operators, single and multiple spindle, Class C	105	101	105	105	(1)
Engine-lathe operators, Class A	151	143	189	150	149
Engine-lathe operators, Class B	133	127	151	131	131
Engine-lathe operators, Class C	110	101	124	106	129
Grinding-machine operators, Class A	154	146	174	152	146
Grinding-machine operators, Class B	130	124	149	130	128
Grinding-machine operators, Class C	113	109	119	111	115
Heat treaters, Class A	145	139	180	142	141
Heat treaters, Class B	126	126	132	127	(1)
Machine-tool operators, miscellaneous, machines	135	125	158	134	139
Machinists, production	158	149	196	160	153

Table 2.--INDEXES OF AVERAGE HOURLY EARNINGS FOR TIME WORKERS IN KEY OCCUPATIONS IN MACHINERY INDUSTRIES, BY SEX, AND REGION, JANUARY 1945 - Continued

Sex, occupation and class	Median index				
(1)	United States (2)	North-east (3)	South (4)	Great Lakes (5)	West (6)
MALES - Processing (Continued)					
Milling-machine operators, Class A	150	140	193	147	144
Milling-machine operators, Class B	132	125	151	131	131
Milling-machine operators, Class C	111	108	116	109	118
Painters, finish	130	125	149	125	138
Painters, rough	113	112	132	114	114
Screw-machine operators, automatic, Class A	157	158	167	157	160
Screw-machine operators, automatic, Class B	135	126	150	138	132
Screw-machine operators, automatic, Class C	113	111	135	112	124
Set-up men, machine tools	158	148	190	158	147
Tool and die makers	171	168	213	166	168
Turret-lathe operators, hand (including hand-screw machine), Class A	151	141	186	151	144
Turret-lathe operators, hand (including hand-screw machine), Class B	129	124	152	130	124
Turret-lathe operators, hand (including hand-screw machine), Class C	113	108	121	113	115
Welders, hand, Class A	151	143	200	146	152
Welders, hand, Class B	133	126	172	127	134
Welders, machine, Class A	143	145	191	136	141
Welders, machine, Class B	131	125	141	130	(1)
Founding					
Coremakers, hand	147	150	175	144	140
Molders, hand, bench	154	150	175	137	152
Molders, floor	148	146	185	141	143
Molders, machine	140	125	183	139	141
Sand mixers, hand and machine	109	108	114	109	104
Stamping and Forming					
Punch-press operators, Class A	124	127	(1)	123	(1)
Punch-press operators, Class B	115	101	132	110	(1)
Sheet-metal operators, miscellaneous mach.	138	141	155	123	(1)
Sheet-metal workers, production	146	150	188	132	(1)
Inspection and Testing					
Inspectors, Class A	152	147	202	152	144
Inspectors, Class B	133	127	147	133	132
Inspectors, Class C	112	111	126	111	112
Recording and Control					
Stock clerks	115	110	136	114	116
Material Movement					
Crane operators, electric bridge	122	118	136	121	129
Truck drivers	116	118	120	115	116
Truckers, power	112	109	122	114	112

Table 2.--INDEXES OF AVERAGE HOURLY EARNINGS FOR TIME WORKERS IN KEY OCCUPATIONS IN MACHINERY INDUSTRIES, BY SEX, AND REGION, JANUARY 1945 - Continued

Sex, occupation and class	Median index				
(1)	United States (2)	North-east (3)	South (4)	Great Lakes (5)	West (6)
MALES (Continued)					
Custodial					
Guards	109	108	118	110	101
Watchmen	90	92	92	91	88
FEMALES					
Processing					
Machining, Assembling, etc.					
Assemblers, Class B	108	103	140	122	106
Assemblers, Class C	94	90	114	96	94
Drill-press operators, single and multiple spindle, Class B	117	107	123	119	104
Drill-press operators, single and mutliple spindle, Class C	96	92	102	100	95
Grinding-machine operators, Class B	125	112	147	130	(1)
Grinding-machine operators, Class C	107	98	116	107	(1)
Milling-machine operators, Class B	122	120	148	132	(1)
Milling-machine operators, Class C	98	96	(1)	99	(1)
Turret-lathe operators, hand (including hand-screw machine) Class B	123	119	142	124	106
Turret-lathe operators, hand (including hand-screw machine) Class C	110	105	114	110	107
Stamping and Forming					
Punch-press operators, Class B	96	86	------	97	(1)
Inspection and Testing					
Inspectors, Class B	119	111	141	124	132
Inspectors, Class C	99	96	121	100	96
Recording and Control					
Stock clerks	99	96	116	86	100
Custodial					
Janitresses	89	88	87	92	89

1/ Insufficient representation to justify computation of an index.

the 55 occupations reported for all regions the differences in rank between the highest and lowest region was not more than 5. When the South was included in the comparison, only 16 male occupations were found that differ in rank by this small amount. 9/ In all four regions tool and die makers and wood pattern makers had the highest rank and watchmen the lowest.

With respect to the female occupations the arrangement of jobs within each region, was considerably more uniform than for the male occupations. 10/ Thus, when the 10 female occupations which are reported in each region were ranked, the difference between the high and low region for 7 occupations was found to be not more than 2 and for the 3 remaining occupations, the difference was 5 and 3 respectively. Janitresses in the Northeast, South and West and stock clerks in the Great Lakes Region appeared at the bottom of the scale of occupational wage indexes. In all regions except the West, the differential above the base was greatest for female turret-lathe operators (Class B); the corresponding group in the West was inspectors, Class B.

The regional data also indicate that the occupational indexes for skilled jobs in the South were substantially higher than in the Northeast, West and Great Lakes regions. Moreover, for 20 of the occupations the indexes in the South ranged above 175 or at least 75 percent above the base. In the Northeast, West and Great Lakes, the indexes are, for most occupations, similar and none of the occupations had indexes above 174 or 74 percent above the base.

The explanation of the high indexes in the South is found in the relatively greater spread in wages between the skilled and unskilled occupations. To illustrate this point, Chart 4 shows the indexes as well as the actual hourly earnings for tool and die makers paid exclusively on a time basis in all reporting cities. The weighted average wage of the base occupation in each city (hand truckers and male janitors) is also indicated. The cities are listed according to the level of the index, with the highest index first.

It will be observed that in 11 Southern cities the indexes are over 200 or more than double the base. Actual average hourly earnings of tool and die makers in these cities range from $1.05 in Charlotte, North Carolina to $1.41 in Houston, Texas. This compares most favorably with wages for the same skilled group in cities in the other regions which vary from $1.01 in Scranton to $1.55 in San Francisco.

While regional differences with respect to actual rates paid to this skilled group are not marked, the spread in the wages of the unskilled workers is significantly larger. In the 11 Southern cities that head the list in Chart 4 average hourly earnings for janitors and hand truckers vary from 45 cents to 64 cents; in 7 of these cities the earnings are under 60 cents. This compares with a range of 59 cents to 99 cents in the remaining 43 cities; in 31 of these cities average hourly earnings for this group were avove 70 cents. Thus, the comparatively high indexes for tool and die

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9/ For example, with number 1 assigned to the highest index (tool and die makers), grinding-machine operators, Class A had rank 11, in the Northeast, 21 in the South, 8 in the Great Lakes region and 12 in the West. A difference of 13 ranks is obtained by comparing the high and low of the 4 regions but only a difference of 4 ranks if the South is excluded.

10/ This may be due, in part, to the smaller number of occupations.

makers in the South is the result primarily of the low wages for the unskilled workers in that region. By the same token, the higher indexes in the South compared to other regions for many other of the key occupations shown in table 2 result from the great spread in wages between skilled and unskilled occupational groups. 11/ Outside of the South this spread is more uniform and consequently the regional wage indexes do not vary markedly.

WAGE RELATIONSHIP AMONG GRADES WITHIN OCCUPATIONS

Several of the key occupations in the machinery industry were subdivided into grades (A, B and C) in order that the data reveal significant wage differences due to dis-similar duties and character of the work performed. No consistent attempt was made to relate the same grade designation among different occupations; grade A drill press operators and grade A machinists, for example, do not necessarily represent the same level of skill, or receive similar wages. The grade A classification merely means that workers in this category perform work that is highly diversified and calls for a considerable degree of technical skill in the particular occupation. The grade B classification was used to designate intermediate skills and grade C, the least skilled group within any given occupation. For certain occupations only two breakdowns by grade (A and B) were provided; for other occupations a three-way classification was found more appropriate.

The influence of skill on occupational wage relationships has already been pointed out in the preceding discussion. An examination of the wage indexes for occupations where grade classifications were provided lends further support to the finding that in general, the index of wage relationship increases with each advance in skill. In all 13 male occupations where a classification by grade was made, the National indexes for class A time workers within each occupation were found to be substantially above the National indexes for grades B and C. When the indexes were examined on a regional basis, the same situation was observed. Grade B workers were, similarly, paid wage rates higher than grade C workers in all occupations and regions, with one exception. This exception occurred in the West where the index for class B assemblers was 2 percent below the index for class C assemblers. As might be expected, therefore, the finding that skill is a highly important determinant in making for occupational wage differentials in the machinery industry is adequately supported by the data.

From the viewpoint of wage administration regional differences in the size of the spread in wages between workers of different skills are of special significance. In the South the spread in wages between grades A and C workers was found to be considerably greater than in the other three regions; on the opposite extreme, in the West, these differences were comparatively small. In the Northeast and Great Lakes regions the grade differentials compared closely. In 7 of 13 occupations in the South the indexes for grade A male time workers were more than 40 percent higher than the indexes for workers in the lowest grades and in two of these occupations (inspectors and milling-machine operators) the differential amounted to 60 and 66 percent. In the West the spread between grades A

11/ A forthcoming series of studies will present for this and other industries the actual wage data for the key occupations.

and C was below 30 percent in all occupations classified by grade and for a majority of these groups, the differential was under 20 percent. Only in one occupation, hand welders, was the spread in wages between the highest and lowest grade workers almost identical in all regions.

It is important to note that actual wages in the different regions may be quite dissimilar even though the percentage differential between grades is identical. Furthermore, the greater differential in the South, does not necessarily mean that grade A workers in that region are paid higher rates than grade A workers in the West. To illustrate, grade A engine-lathe operators may receive 76 cents in the South, and grade C workers, 50 cents; the spread is then 52 percent. In the West grade A workers may get $1.16 an hour and grade C workers $1.00, a spread of only 16 percent.

The lack of uniformity among the regions with respect to the relationship of wages among workers of specified skills reflects important regional differences in labor market conditions. On the basis of the data presented in this report it would appear that in the South the most skilled workers within a given occupation in the machinery industry are more difficult to obtain than the least skilled type. In the West, despite the tightness of the labor market, a more even balance between labor requirements and labor supply of workers of particular skills seems to have been obtained.

Because of a closer similarity in work performed and skills required, the wage spread between class B and class C workers is narrower within each region than between class A and class C workers. In addition, the regions compare more closely with respect to the spread between grades B and C than on the basis of the spread between grades A and C. It would appear that the difficulty (or facility) in securing workers of intermediate skills in relation to the least skilled is more uniform among the regions than in the case of the highest grade of skill.

CHART I

INDEXES OF AVERAGE WAGE RATES FOR MALE WORKERS IN KEY OCCUPATIONS IN MACHINERY INDUSTRIES

JANUARY 1945

WEIGHTED AVERAGE WAGES FOR MALE JANITORS AND HAND TRUCKERS = 100

OCCUPATION AND CLASS	MEDIAN INDEX
PATTERNMAKERS, WOOD	175
TOOL AND DIE MAKERS	171
WORKING FOREMEN, PROCESSING DEPARTMENT	163
MACHINISTS, PRODUCTION	158
SET-UP MEN, MACHINE TOOLS	158
SCREW-MACHINE OPERATORS, AUTOMATIC, CLASS A	157
MACHINISTS, MAINTENANCE	156
MOLDERS, HAND, BENCH	154
GRINDING-MACHINE OPERATORS, CLASS A	154
INSPECTORS, CLASS A	152
ELECTRICIANS, MAINTENANCE	152
WELDERS, HAND, CLASS A	151
ENGINE-LATHE OPERATORS, CLASS A	151
TURRET-LATHE OPERATORS, HAND (INCL. HAND-SCREW MACHINE) CLASS A	151
MILLING-MACHINE OPERATORS, CLASS A	150
MOLDERS, FLOOR	148
COREMAKERS, HAND	147
SHEET-METAL WORKERS, PRODUCTION	146
HEAT TREATERS, CLASS A	145
MECHANICS, MAINTENANCE	145
ASSEMBLERS, CLASS A	144
MILLWRIGHTS	143
WELDERS, MACHINE, CLASS A	143
CARPENTERS, MAINTENANCE	140
MOLDERS, MACHINE	140
DRILL-PRESS OPERATORS, RADIAL, CLASS A	140
DRILL-PRESS OPERATORS, SINGLE & MULTIPLE SPINDLE, CLASS A	138
SHEET-METAL-MACHINE OPERATORS, MISCELLANEOUS MACHINES	138
MACHINE-TOOL OPERATORS, MISCELLANEOUS MACHINES	135
SCREW-MACHINE OPERATORS, AUTOMATIC, CLASS B	135
MAINTENANCE MEN, GENERAL UTILITY	134
ENGINE-LATHE OPERATORS, CLASS B	133
INSPECTORS, CLASS B	133
WELDERS, HAND, CLASS B	133
MILLING-MACHINE OPERATORS, CLASS B	132
WELDERS, MACHINE, CLASS B	131
PAINTERS, FINISH	130
GRINDING-MACHINE OPERATORS, CLASS B	130
TURRET-LATHE OPERATORS, HAND (INCL. HAND-SCREW MACHINE) CLASS B	129
ASSEMBLERS, CLASS B	128
DRILL-PRESS OPERATORS, RADIAL, CLASS B	127
HEAT TREATERS, CLASS B	126
PUNCH-PRESS OPERATORS, CLASS A	124
CRANE OPERATORS, ELECTRIC BRIDGE	122
DRILL-PRESS OPERATORS, SINGLE & MULTIPLE SPINDLE, CLASS B	121
TRUCK DRIVERS	116
STOCK CLERKS	115
PUNCH-PRESS OPERATORS, CLASS B	115
SCREW-MACHINE OPERATORS, AUTOMATIC, CLASS C	113
PAINTERS, ROUGH	113
TURRET-LATHE OPERATORS, HAND (INCL. HAND-SCREW MACHINE) CLASS C	113
CHIPPERS AND GRINDERS	113
GRINDING-MACHINE OPERATORS, CLASS C	113
TRUCKERS, POWER	112
INSPECTORS, CLASS C	112
DRILL-PRESS OPERATORS, RADIAL, CLASS C	112
MILLING-MACHINE OPERATORS, CLASS C	111
ASSEMBLERS, CLASS C	111
ENGINE-LATHE OPERATORS, CLASS C	110
SAND MIXERS, HAND AND MACHINE	109
GUARDS	109
DRILL-PRESS OPERATORS, SINGLE & MULTIPLE SPINDLE, CLASS C	105
WATCHMEN	90

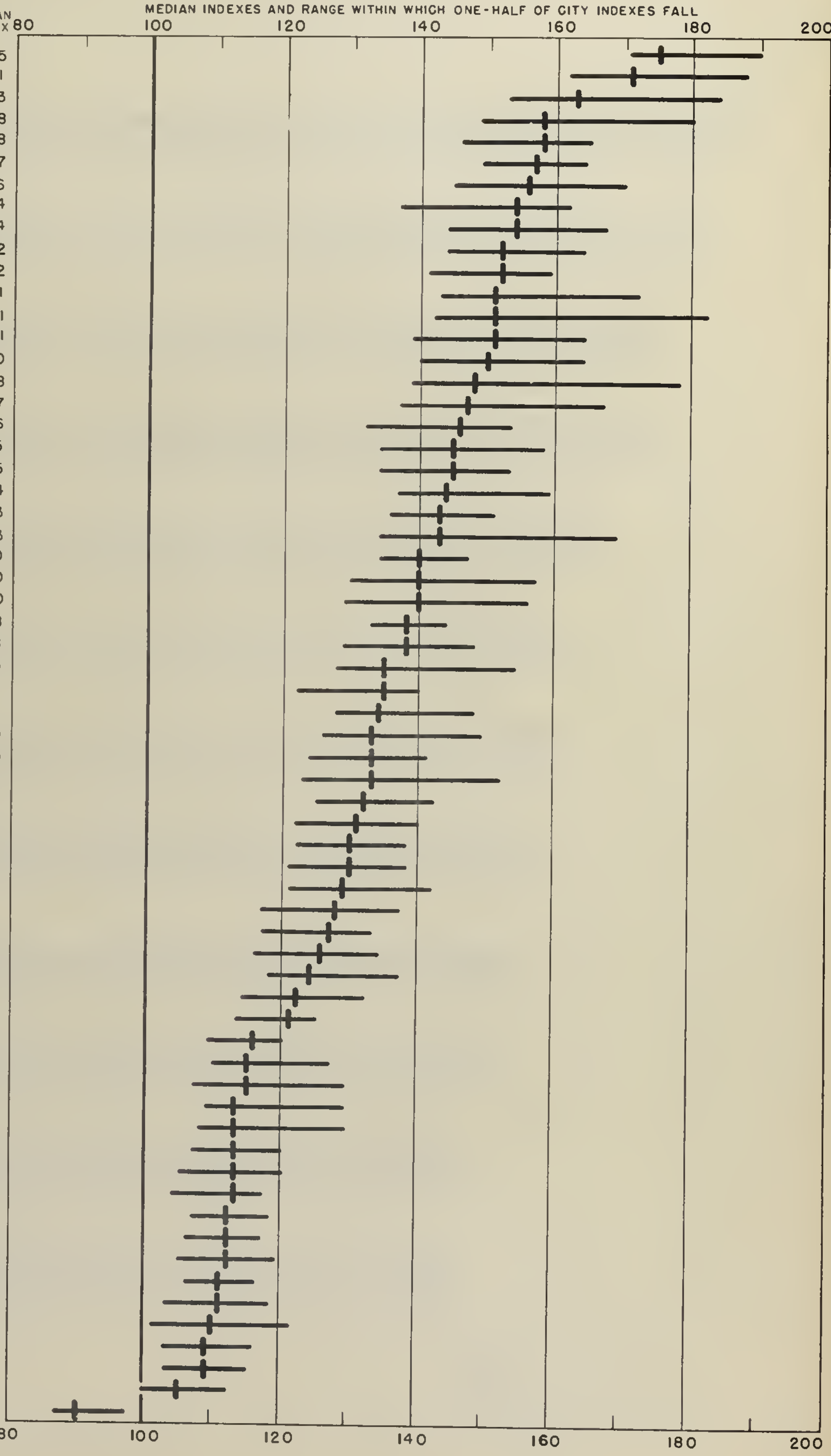

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CHART 2

INFLUENCE OF METHOD OF WAGE PAYMENT ON OCCUPATIONAL WAGE RELATIONSHIPS IN MACHINERY INDUSTRIES

JANUARY 1945

WEIGHTED AVERAGE WAGES FOR MALE JANITORS AND HAND TRUCKERS = 100

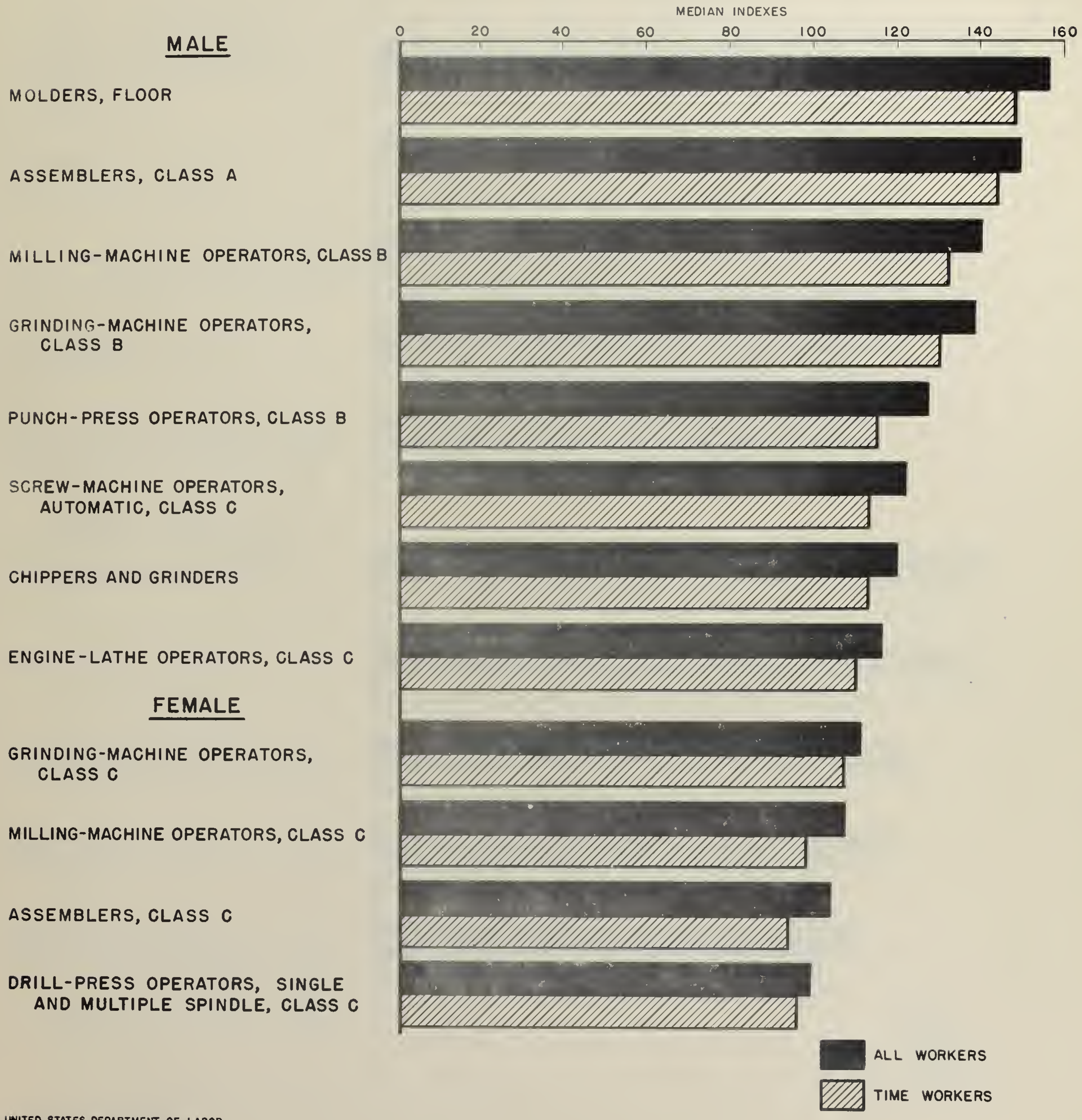

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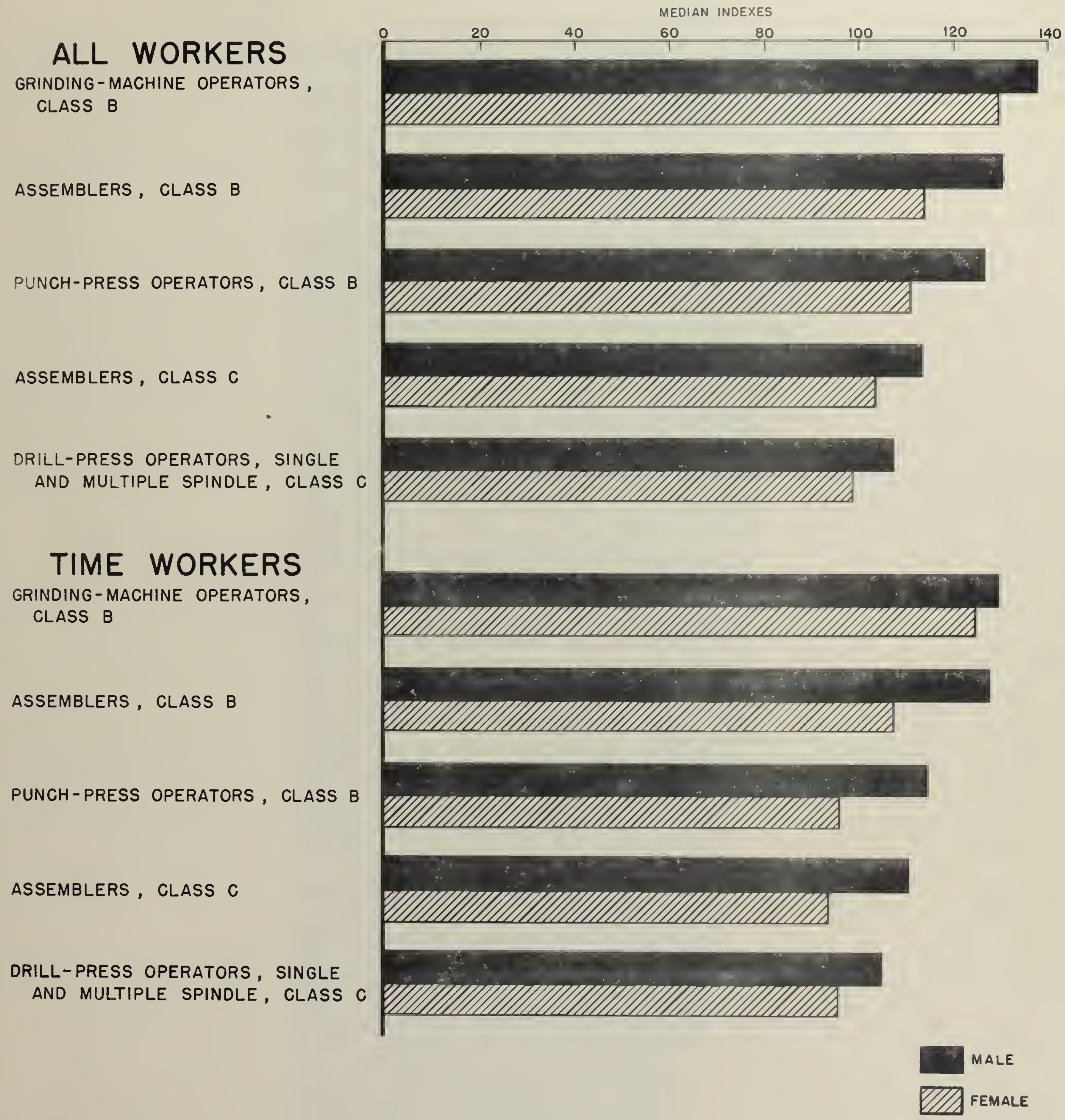
CHART 3

RELATIONSHIP BETWEEN EARNINGS INDEXES OF MALE AND FEMALE WORKERS IN SELECTED OCCUPATIONS IN MACHINERY INDUSTRIES

JANUARY 1945

WEIGHTED AVERAGE WAGES FOR MALE JANITORS AND HAND TRUCKERS = 100



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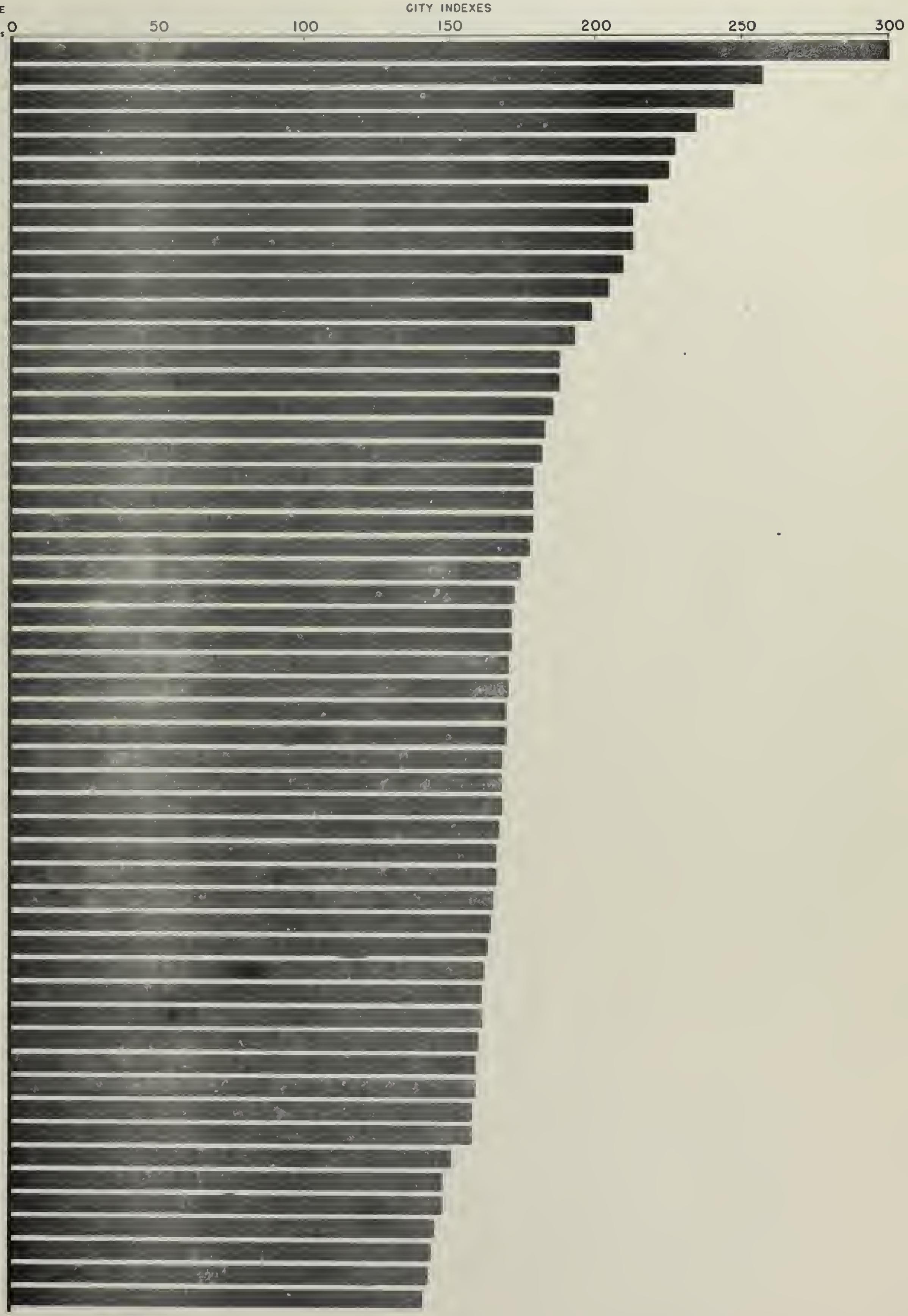
CITY INDEXES OF AVERAGE WAGE RATES FOR MALE TOOL AND DIE MAKERS IN MACHINERY INDUSTRIES

JANUARY 1945

WEIGHTED AVERAGE WAGES FOR MALE JANITORS AND HAND TRUCKERS = 100

	AVERAGE WAGE RATE	
	TOOL AND DIE MAKERS	JANITORS AND HAND TRUCKERS
NORFOLK, VA.	$1.35	$0.45
MEMPHIS, TENN.	1.31	.51
ATLANTA, GA.	1.26	.51
FORT WORTH, TEXAS	1.24	.53
HOUSTON, TEXAS	1.41	.62
LOUISVILLE, KY.	1.28	.57
WILMINGTON, DEL.	1.40	.64
BIRMINGHAM, ALA.	1.19	.56
TULSA, OKLA.	1.34	.63
CHARLOTTE, N.C.	1.05	.50
RICHMOND, VA.	1.19	.58
ST LOUIS, MO.	1.39	.70
KANSAS CITY, MO.	1.41	.73
BALTIMORE, MD.	1.20	.64
CINCINNATI, OHIO	1.26	.67
JACKSONVILLE, FLA.	1.10	.59
NEW YORK, N.Y.	1.43	.78
PHILADELPHIA, PA.	1.31	.72
DAYTON, OHIO	1.47	.82
INDIANAPOLIS, IND.	1.27	.71
DALLAS, TEXAS	1.09	.61
MINNEAPOLIS, MINN.	1.30	.73
FALL RIVER, MASS.	1.12	.64
AKRON, OHIO	1.35	.78
PEORIA, ILL.	1.29	.75
DENVER, COLO.	1.17	.68
NEW HAVEN, CONN	1.20	.70
CHATTANOOGA, TENN.	1.01	.59
CLEVELAND, OHIO	1.39	.82
HARTFORD, CONN.	1.24	.73
BRIDGEPORT, CONN.	1.27	.75
ERIE, PA.	1.27	.75
SPOKANE, WASH.	1.27	.75
LOS ANGELES, CALIF.	1.43	.85
SAN FRANCISCO, CALIF.	1.55	.93
BOSTON, MASS.	1.20	.72
SOUTH BEND, IND.	1.21	.73
DETROIT, MICH.	1.52	92
YOUNGSTOWN, OHIO	1.31	.80
COLUMBUS, OHIO	1.24	.76
PITTSBURGH, PA.	1.26	.78
LOWELL, MASS.	1.07	.66
SEATTLE, WASH.	1.45	.90
TOLEDO, OHIO	1.39	.87
WORCESTER, MASS.	1.12	.70
GRAND RAPIDS, MICH.	1.21	.76
FORT WAYNE, IND.	1.19	.75
DULUTH, MINN.	1.17	.77
FLINT, MICH.	1.47	.99
SCRANTON, PA.	1.01	.68
SPRINGFIELD, MASS.	1.14	.78
READING, PA.	1.06	.73
CANTON, OHIO	1.17	.81
PORTLAND, OREG.	1.35	.95



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no. 2

OCCUPATIONAL WAGE RELATIONSHIPS

SERIES 1
NO. 2

MACHINE TOOL ACCESSORIES
1945

UNITED STATES DEPARTMENT OF LABOR
BUREAU OF LABOR STATISTICS

WAGE ANALYSIS BRANCH
INDUSTRY WAGE STUDIES DIVISION
HARRY OBER, CHIEF

PREFACE

The Industry Wage Study program of the Bureau of Labor Statistics is designed to yield a variety of wage data for use in collective bargaining, wage determination, placement, and minimum wage administration.

The results of the Industry Wage Studies are made available in two series of bulletins. Series 1, entitled "Occupational Wage Relationships", provides measures of prevailing wage relationships among key occupations in each industry in terms of indexes. Series 2 on "Wage Structure" is devoted to an analysis of actual hourly earnings (straight-time) and the various elements that influence variations in wages such as location, size of establishment, methods of wage payment, and the occupational composition of each industry. This series also presents information relating to such practices as shift differential payments, paid vacations, paid lunch periods, nonproduction bonuses, insurance, and incentive wage systems. Locality tabulations (forms OWR-17 and 18) are available in the regional offices of the Bureau.

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OCCUPATIONAL WAGE RELATIONSHIPS IN THE MACHINE TOOL ACCESSORY INDUSTRY, JANUARY 1945 1/

INTRODUCTION

The high degree of occupational specialization characteristic of most manufacturing establishments is usually accompanied by a corresponding diversity in pay scales. The maintenance or modification of wage differentials among occupational groups in line with changing techniques and labor requirements constitute recurring problems in wage administration and collective bargaining.

In the process of setting occupational wage rates, reference is generally made to prevailing rates in the labor market. Usually only a limited number of jobs (key jobs) are used as bench-marks. In some situations only the highest- and lowest-skilled jobs are used to define the limits of the wage structure; in others guide-posts are included at various points along the pay scale. Once rates are determined for the key jobs, the pricing of other occupations is achieved by comparison with the former in terms of skill, responsibility, traditionally established differentials, and other factors bearing upon wage rates. In some methods of job evaluation, this process is usually aided by a systematic rating scale to determine differences between one job and another.

The Bureau's industry wage studies provide occupational wage information for key jobs 2/ only--that is, jobs that are found in numerous establishments; those that engage substantial numbers of workers; and those that have been used as bench-marks in wage negotiations. It is assumed that if data for key jobs are available, rates for other occupations can be arrived at by comparison and interpolation taking into account general similarity of job content. It is the object of the present study to analyze the extensive wage data available for the machine tool accessory industry for the purpose of determining what central tendencies may be observed in wage differentials among occupations.

1/ This report was prepared by Joseph W. Bloch. Data were obtained through an industry wage survey conducted under the direction of the Regional Wage Analysts of the Bureau. A previous bulletin, "Wage Structure: Machine Tool Accessories, 1945", described the wage and occupational structure of the industry.

2/ Job descriptions are available on request.

The method adopted for this purpose is as follows: In each city or wage area 3/ the combined average time rates of unskilled jobs, janitors and hand truckers in this case, are used as a base (100); time rates for other jobs are expressed as a percentage of the base. 4/ In this manner a ladder-like arrangement of occupational indexes is developed for the key jobs in each locality. In order to obtain a representative figure for all areas in an industry, the median 5/ or midpoint of an array of city indexes for a job (production machinists, for example) is selected. It is recognized, however, that some measure of variance from the median is essential in order to provide flexibility in the use of the data. For this purpose the middle range is shown within which half of the city indexes fall.

The occupational wage relationships indicated by this study constitute a background in the light of which plant policies may be formulated. Plant wage scales will often differ from the city or nation-wide patterns. Despite these differences the patterns can be of considerable use in comparing differentials between skill levels, in evaluating out-of-line rates, and in placing new jobs into the wage scale.

3/ A wage area is defined as a central city and such surrounding territory as constitutes a relatively homogeneous area with respect to wage structure. In this report the terms "wage area" and "city" are used interchangeably.

4/ In order to avoid bias introduced by the payment of some workers on an incentive basis, only the wages of time workers were used in this study. This also facilitated comparison between production shops (in which incentive pay was of some significance) and jobbing shops (in which it was negligible). These two branches of the machine tool accessory industry are described below.

5/ The median is preferable to the arithmetic mean in this instance since it is affected by extreme cases in a considerably lesser degree.

NATION-WIDE WAGE RELATIONSHIPS 6/

Machine tool accessory plants are engaged in the manufacture of attachments and accessories for machine tools and other metalworking machinery, small power-driven cutting and shaping tools and tool holders, and precision measuring tools. Early in 1945, production shops constituting about one-sixth of approximately 2,100 establishments produced and stocked standard items of general usefulness. The rest were jobbing shops, fabricating more specialized tools and dies according to specifications submitted by other metalworking plants.

In January 1945, about two-thirds of the labor force in production shops was concentrated in or around 15 large cities. Wage data relating to a January 1945 pay-roll period 7/ were obtained from 109 representative establishments employing 22,000 workers at the time of survey. 8/ Eighty percent of total employment in tool and die jobbing shops was in 31 large cities. 9/ For this branch, 523 establishments employing 22,400 workers were covered. With the exception of 3 occupations performed by men and 4 by women in production shops the list of occupations for which indexes are presented is identical in the two branches of the industry. Not all of the occupations appear in each city; consequently for most of the occupations median indexes were drawn from fewer than the total number of cities covered.

6/ Since the reader may wish to compare the relationships shown by the indexes with those indicated by actual earnings, as presented in the report "Wage Structure: Machine Tool Accessory Industry, 1945", the essential differences between the two types of data should be noted. Basically, the differences between the 2 studies was one of purpose; in order to indicate wage relationships, spread between rates rather than rates as such was measured and averaged. Variations in wage levels among the areas covered were of little consequence in this regard. For its purpose, the present study used methods and industry coverage differing significantly from the wage structure analysis.

7/ Since early 1945, straight-time wage rates have increased in a large portion of the metalworking industries. Insofar as wage rate changes cover all or the bulk of the labor force equally, they do not alter the relative position of each occupation in the wage scale. Uniform percentage changes have no effect upon spread, while straight cents-per-hour increases compress the wage scale, reducing spread moderately. It should be noted, too, that this study is based upon time workers only, hence the fluctuations that generally occur in incentive earnings are not a factor in this instance.

8/ In some cities all production shops were covered; in others a representative sample was scheduled. This was also the case for tool and die jobbing shops.

9/ These 31 cities and the 15 from which data were obtained for production shops are identified in table 2.

General wage pattern

In table 1, the national indexes 10/ for the selected occupations are presented separately for production shops and jobbing shops. The middle range within which half of the city indexes fell and the number of cities represented in each of the occupations are also shown. In charts 1 and 2, the occupations in which men were engaged are arrayed in descending rank in accordance with their average position in the wage scale.

A comparison of the two charts reveals a high degree of similarity in the ranking of occupations in production and jobbing shops despite marked differences in position among a few of the occupations. 11/ In both branches, working foremen and tool and die makers headed the list while watchmen were at the bottom. The spread between the earnings of the highest and lowest paid occupations was, however, greater in the jobbing branch of the industry. Tool and die makers in jobbing shops generally averaged twice as much as the base, as contrasted with an 80 percent spread in production shops.

In all but 4 occupations (guards, watchmen, women class C drill-press and milling-machine operators) the median indexes for jobbing shop workers exceeded those for production shop workers. In 9 occupations, the differential in favor of jobbing shops was negligible, less than 5 percent. Thus, in 31 of the 44 occupations in which comparison was possible, jobbing shop workers held a decided advantage in terms of spread above the base. 12/ Of the 13 occupations in which the indexes for production shops exceeded or approximately equalled those shown for jobbing shops, 11 were at the lower end of the wage scale.

10/ These indexes represent the average percentage relationships to the base. They also can be used to compute the approximate percentage spread between other occupations in the wage ladder. For example, the median index for tool and die makers in jobbing shops was 204 or 104 percent above the base whereas maintenance machinists had an index of 181 or 81 percent above the base. The percentage differential between these 2 occupations was 13 percent although they were separated by 23 index points.

11/ The ranking in both branches corresponds closely with that of similar occupations in the machinery industry. See Monthly Labor Review, February 1946, p. 273.

12/ This dissimilarity might have resulted from differences in the level of earnings of workers in the base jobs rather than in the other occupations. The choice of unskilled jobs could also have modified the relationships between the two series. In the present study there was no significant difference between the earnings of janitors and hand truckers in the two branches. Moreover, since the 13 occupations in which production shop indexes equalled or exceeded those for jobbing shops were mainly low-skilled jobs, the advantage shown for the majority of jobbing shop occupations cannot be attributed to differences in the base. Under these conditions, the higher level of indexes in jobbing shops is also an indication that, on the whole, actual wage rates of time workers were higher in this branch of the industry in January 1945.

Table 1.--INDEXES OF AVERAGE WAGE RATES 1/ FOR TIME WORKERS IN SELECTED OCCUPATIONS IN MACHINE TOOL ACCESSORY INDUSTRY, BY TYPE OF ESTABLISHMENT, JANUARY 1945

(Weighted average wages for male janitors and hand truckers = 100)

	Occupation, grade, and sex	Production shops			Jobbing shops		
		Number of cities reporting	Median index	Middle range within which one-half of the city indexes fell	Number of cities reporting	Median index	Middle range within which one-half of the city indexes fell
	Men						
Maintenance:	Carpenters, maintenance	9	136	135 - 147	17	147	132 - 157
	Electricians, maintenance	9	159	152 - 178	16	162	157 - 175
	Machinists, maintenance	9	155	152 - 160	15	181	165 - 190
	Maintenance men, general utility	11	141	127 - 152	24	156	151 - 162
	Mechanics, maintenance	7	146	139 - 147	10	160	154 - 183
Supervision:	Working foremen, processing departments	15	182	168 - 190	30	230	209 - 240
Processing:	Assemblers, class A	10	150	144 - 163	13	169	143 - 187
	Assemblers, class B	12	128	122 - 135	17	140	125 - 154
	Assemblers, class C	9	104	100 - 114	13	110	106 - 118
	Drill-press operators, single and multiple spindle, class A	6	138	121 - 147	9	152	143 - 163
	Drill-press operators, single and multiple spindle, class B	12	125	117 - 131	17	129	117 - 136
	Drill-press operators, single and multiple spindle, class C	8	107	100 - 112	19	108	101 - 114
	Engine-lathe operators, class A	13	162	142 - 174	30	179	169 - 189
	Engine-lathe operators, class B	15	132	124 - 139	26	149	144 - 156
	Engine-lathe operators, class C	12	113	105 - 117	16	122	116 - 132
	Grinding-machine operators, class A	15	158	145 - 167	29	188	176 - 204
	Grinding-machine operators, class B	14	136	124 - 140	27	151	148 - 170
	Grinding-machine operators, class C	12	119	111 - 122	17	122	114 - 131
	Heat treaters, class A	11	169	166 - 171	18	174	166 - 187
	Heat treaters, class B	11	131	115 - 133	12	142	137 - 144
	Machine-tool operators, miscellaneous machines	12	131	126 - 134	31	152	142 - 165
	Machinists, production	10	161	140 - 172	26	172	163 - 190
	Milling-machine operators, class A	14	148	140 - 164	25	172	159 - 180
	Milling-machine operators, class B	14	130	124 - 135	26	142	132 - 152
	Milling-machine operators, class C	12	111	109 - 116	17	119	112 - 123
	Screw-machine operators, automatic, class A	6	159	143 - 200	(2/)	(2/)	(2/)
	Screw-machine operators, automatic, class B	9	136	131 - 145	(2/)	(2/)	(2/)
	Screw-machine operators, automatic, class C	6	122	115 - 126	(2/)	(2/)	(2/)
	Set-up men, machine tools	12	149	141 - 165	18	169	150 - 181
	Tool and die makers	15	178	172 - 189	31	204	198 - 224
	Turret-lathe operators, hand (including hand screw machine), class A	7	155	153 - 156	24	167	157 - 181
	Turret-lathe operators, hand (including hand screw machine), class B	12	135	127 - 136	22	149	136 - 159
	Turret-lathe operators, hand (including hand screw machine), class C	11	114	110 - 119	16	121	115 - 125
Inspection and testing:	Inspectors, class A	9	159	153 - 179	24	196	181 - 217
	Inspectors, class B	12	130	126 - 137	16	150	145 - 164
	Inspectors, class C	11	111	107 - 114	11	122	114 - 125
Recording and control:	Stock clerks	13	107	104 - 122	21	124	117 - 129
Material movement:	Truck drivers	12	118	118 - 126	22	124	115 - 128
Custodial:	Guards	8	111	109 - 114	15	103	101 - 117
	Watchmen	11	103	95 - 107	24	89	84 - 95
	Women						
Processing:	Assemblers, class B	6	103	100 - 111	(2/)	(2/)	(2/)
	Assemblers, class C	8	93	91 - 100	11	98	96 - 102
	Drill-press operators, single and multiple spindle, class C	12	108	101 - 113	18	101	96 - 109
	Engine-lathe operators, class C	10	109	104 - 114	8	112	107 - 115
	Grinding-machine operators, class B	7	122	117 - 129	(2/)	(2/)	(2/)
	Grinding-machine operators, class C	12	109	100 - 115	(2/)	(2/)	(2/)
	Milling-machine operators, class C	12	108	106 - 110	15	105	101 - 115
Inspection and testing:	Inspectors, class B	7	124	117 - 126	9	131	123 - 140
	Inspectors, class C	13	104	101 - 112	17	110	104 - 112
Recording and control:	Stock clerks	9	102	99 - 114	(2/)	(2/)	(2/)
Custodial:	Janitors	7	93	93 - 94	8	95	92 - 96

1/ Excluding premium pay for overtime and night work.

2/ Number of cities too small to justify selection of median.

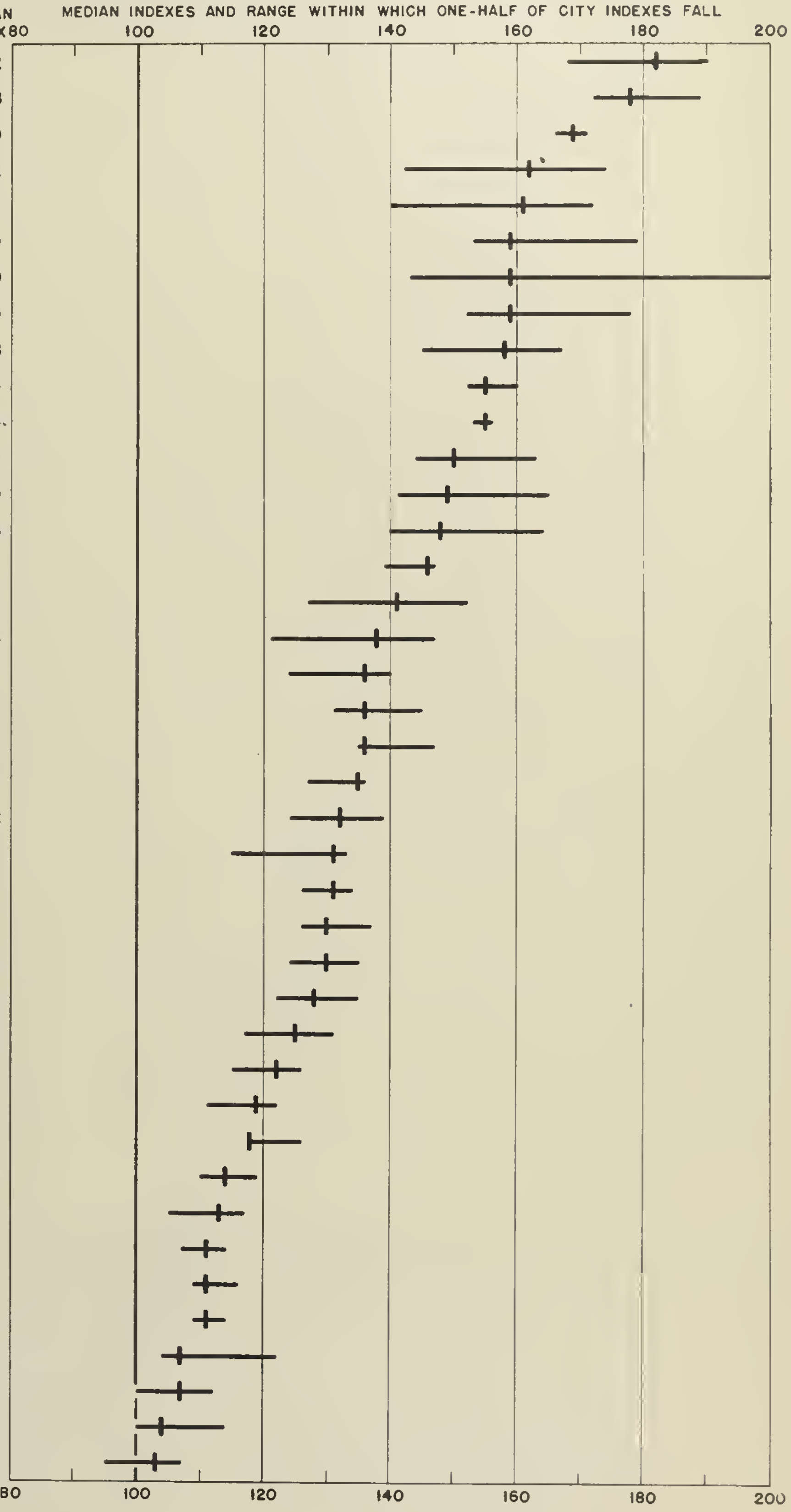
CHART 1

INDEXES OF AVERAGE WAGE RATES FOR MEN IN SELECTED OCCUPATIONS IN MACHINE TOOL ACCESSORY PRODUCTION ESTABLISHMENTS

JANUARY 1945

WEIGHTED AVERAGE WAGES FOR MALE JANITORS AND HAND TRUCKERS = 100

OCCUPATION AND CLASS	MEDIAN INDEX
WORKING FOREMEN, PROCESSING DEPARTMENTS	182
TOOL AND DIE MAKERS	178
HEAT TREATERS, CLASS A	169
ENGINE-LATHE OPERATORS, CLASS A	162
MACHINISTS, PRODUCTION	161
INSPECTORS, CLASS A	159
SCREW-MACHINE OPERATORS, AUTOMATIC, CLASS A	159
ELECTRICIANS, MAINTENANCE	159
GRINDING-MACHINE OPERATORS, CLASS A	158
MACHINISTS, MAINTENANCE	155
TURRET-LATHE OPERATORS, HAND (INCL. HAND-SCREW MACHINE) CLASS A	155
ASSEMBLERS, CLASS A	150
SET-UP MEN, MACHINE TOOLS	149
MILLING-MACHINE OPERATORS, CLASS A	148
MECHANICS, MAINTENANCE	146
MAINTENANCE MEN, GENERAL UTILITY	141
DRILL-PRESS OPERATORS, SINGLE AND MULTIPLE SPINDLE, CLASS A	138
GRINDING-MACHINE OPERATORS, CLASS B	136
SCREW-MACHINE OPERATORS, AUTOMATIC, CLASS B	136
CARPENTERS, MAINTENANCE	136
TURRET-LATHE OPERATORS, HAND (INCL. HAND-SCREW MACHINE) CLASS B	135
ENGINE-LATHE OPERATORS, CLASS B	132
HEAT TREATERS, CLASS B	131
MACHINE-TOOL OPERATORS, MISCELLANEOUS MACHINES	131
INSPECTORS, CLASS B	130
MILLING-MACHINE OPERATORS, CLASS B	130
ASSEMBLERS, CLASS B	128
DRILL-PRESS OPERATORS, SINGLE AND MULTIPLE SPINDLE, CLASS B	125
SCREW-MACHINE OPERATORS, AUTOMATIC, CLASS C	122
GRINDING-MACHINE OPERATORS, CLASS C	119
TRUCK DRIVERS	118
TURRET-LATHE OPERATORS, HAND (INCL. HAND-SCREW MACHINE) CLASS C	114
ENGINE-LATHE OPERATORS, CLASS C	113
INSPECTORS, CLASS C	111
MILLING-MACHINE OPERATORS, CLASS C	111
GUARDS	111
STOCK CLERKS	107
DRILL-PRESS OPERATORS, SINGLE AND MULTIPLE SPINDLE, CLASS C	107
ASSEMBLERS, CLASS C	104
WATCHMEN	103



UNITED STATES DEPARTMENT OF LABOR
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AVERAGE WAGE RATES INCLUDE TIME RATES ONLY

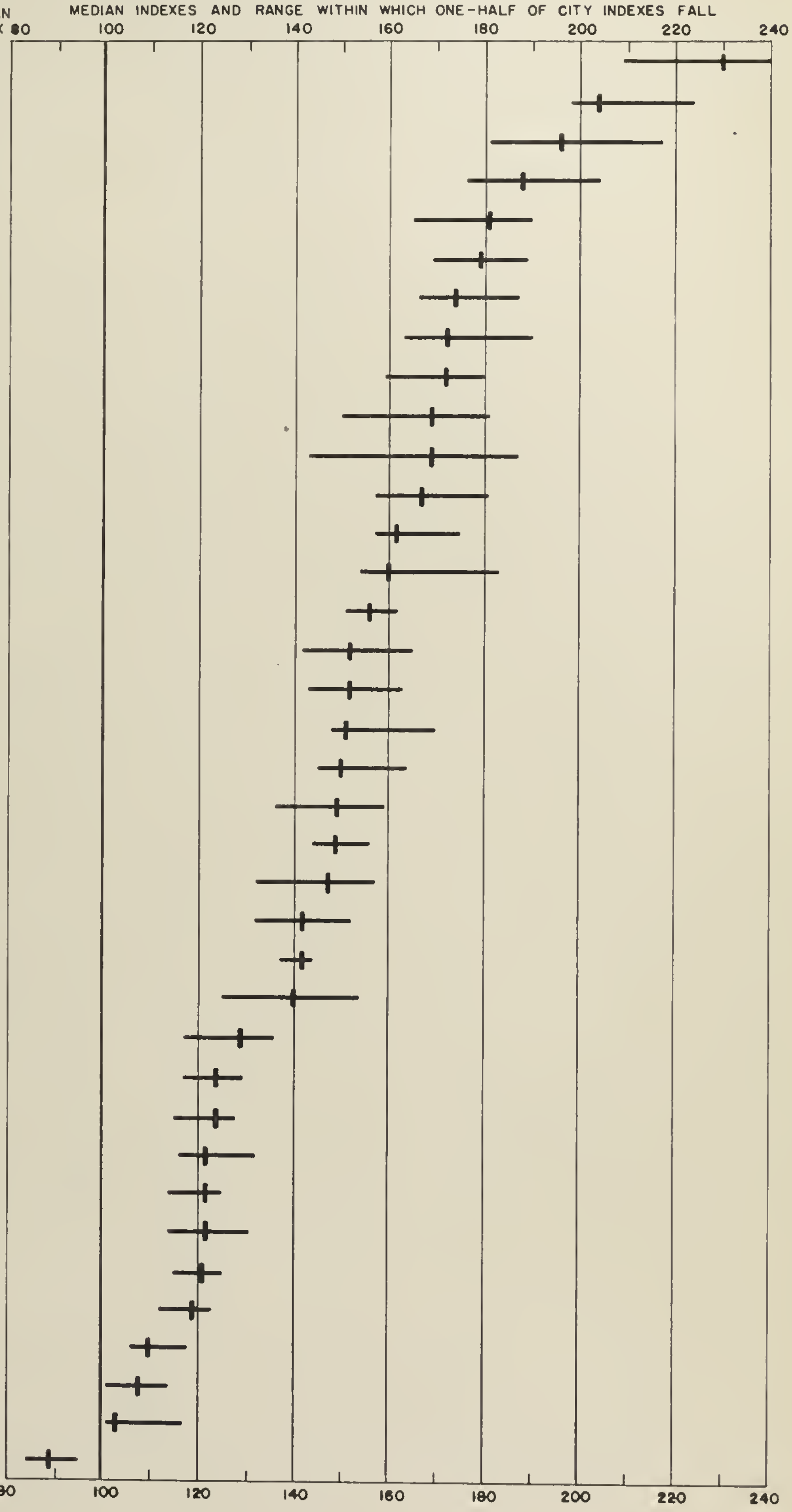
CHART 2

INDEXES OF AVERAGE WAGE RATES FOR MEN IN SELECTED OCCUPATIONS IN TOOL AND DIE JOBBING SHOPS

JANUARY 1945

WEIGHTED AVERAGE WAGES FOR MALE JANITORS AND HANDTRUCKERS = 100

OCCUPATION AND CLASS	MEDIAN INDEX
WORKING FOREMEN, PROCESSING DEPARTMENT	230
TOOL AND DIE MAKERS	204
INSPECTORS, CLASS A	196
GRINDING-MACHINE OPERATORS, CLASS A	188
MACHINISTS, MAINTENANCE	181
ENGINE-LATHE OPERATORS, CLASS A	179
HEAT TREATERS, CLASS A	174
MACHINISTS, PRODUCTION	172
MILLING-MACHINE OPERATORS, CLASS A	172
SET-UP MEN, MACHINE TOOLS	169
ASSEMBLERS, CLASS A	169
TURRET-LATHE OPERATORS, HAND (INCL. HAND-SCREW MACHINE) CLASS A	167
ELECTRICIANS, MAINTENANCE	162
MECHANICS, MAINTENANCE	160
MAINTENANCE MEN, GENERAL UTILITY	156
MACHINE-TOOL OPERATORS, MISCELLANEOUS MACHINES	152
DRILL-PRESS OPERATORS SINGLE AND MULTIPLE SPINDLE, CLASS A	152
GRINDING-MACHINE OPERATORS, CLASS B	151
INSPECTORS, CLASS B	150
TURRET-LATHE OPERATORS, HAND (INCL. HAND-SCREW MACHINE) CLASS B	149
ENGINE-LATHE OPERATORS, CLASS B	149
CARPENTERS, MAINTENANCE	147
MILLING-MACHINE OPERATORS, CLASS B	142
HEAT TREATERS, CLASS B	142
ASSEMBLERS, CLASS B	140
DRILL-PRESS OPERATORS, SINGLE AND MULTIPLE SPINDLE, CLASS B	129
STOCK CLERKS	124
TRUCK DRIVERS	124
ENGINE-LATHE OPERATORS, CLASS C	122
INSPECTORS, CLASS C	122
GRINDING-MACHINE OPERATORS, CLASS C	122
TURRET-LATHE OPERATORS, HAND (INCL HAND-SCREW MACHINE) CLASS C	121
MILLING-MACHINE OPERATORS, CLASS C	119
ASSEMBLERS, CLASS C	110
DRILL-PRESS OPERATORS, SINGLE AND MULTIPLE SPINDLE, CLASS C	108
GUARDS	103
WATCHMEN	89



UNITED STATES DEPARTMENT OF LABOR
BUREAU OF LABOR STATISTICS

AVERAGE WAGE RATES INCLUDE TIME RATES ONLY

Wage spread between skill levels

Table 1 and charts 1 and 2 reveal clusters of occupational earnings closely paralleling differences in skill. Thus, among men in production shops, a skilled group averaging from 55 to 62 percent above the base consisted of class A engine-lathe, automatic screw-machine, grinding-machine and turret-lathe operators as well as production machinists. Within this high-wage group were also class A inspectors, maintenance electricians, and maintenance machinists. Another cluster, approximately 50 percent above the base, comprised class A assemblers, set-up men, class A milling-machine operators, and maintenance mechanics. Further down the line, approximately one-third above the base, were class B machine operators, excepting drill-press operators.

In jobbing shops, at a level 80 percent or more above the base were class A inspectors, grinding-machine and engine-lathe operators, and maintenance machinists. Below this small cluster, approximately 70 percent above the base, came class A heat treaters, milling-machine and turret-lathe operators, assemblers, production machinists, and set-up men. Midway in the wage ladder, approximately 50 percent above the base, were class B machine-tool operators (other than drill-press operators). Another concentration, on the average one-fifth above the base, included class C engine-lathe and grinding-machine operators, inspectors, turret-lathe and milling-machine operators, stock clerks and truck drivers.

A notable similarity in wage relationships was observed within the occupations with grade designations (class A, B, and C). 13/ In production shops, the percentage differential between class A and B men (between 14 and 17 percent) generally equalled that separating class B and C men (14 to 18 percent). In the comparison of spreads between class A and C workers somewhat of the same consistency was found. While class A engine-lathe operators, assemblers, and inspectors averaged over 40 percent more than the class C men, the differentials between class A and C men on the drill press, grinding, milling, automatic screw machines, and turret lathes were confined within the relatively narrow range of approximately 30 to 35 percent.

In the jobbing branch of the industry, the differentials between grade levels were wider. In most instances, class A exceeded class B workers in the same occupations by margins clustering around 20 percent. With the exception of assemblers, where the spread exceeded 25 percent, the advantage of class B over class C workers

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13/ These grades were used in classifying workers within certain occupations because it was recognized that the duties performed and the wages paid were sufficiently dissimilar to warrant the subdivision. This procedure does not imply an equivalent skill level among jobs with the same grade designation. For example, class A drill-press operators and class A engine-lathe operators are not necessarily of equal skill. Moreover, the differences between the class A and B workers in the two categories are not necessarily the same.

also clustered near 20 percent. The spread between class A and class C workers was smallest in the case of turret-lathe operators (38 percent) and highest in the case of inspectors (62 percent). Among the 5 other occupations in which a class breakdown was employed, 2 showed differentials between class A and C of slightly more than 50 percent and 3 around 45 percent. For the most part, the variation in differentials between class A and C workers resulted from a greater spread of average earnings among the top-skilled rather than among the lesser-skilled workers.

It is difficult to determine precisely the reasons for the greater wage spread between broad skill levels found in jobbing shops. Differences between the two branches with respect to job content, proportion of skilled workers employed, size of plant, unionization, and location probably influenced the variation in wage patterns. 14/

Wage levels of women

The highest paid women workers in production shops 15/ were class B inspectors and class B grinding-machine operators, averaging over 20 percent more than men in the base jobs. On an equivalent level, approximately 9 percent above the base, were class C drill-press, engine-lathe, grinding-machine, and milling-machine operators. In those occupations for which comparison was possible, the differential in spread above the base in favor of men ranged from a negligible amount to 24 percent in the case of class B assemblers; the average differential was about 8 percent. Only as class C drill-press operators did women match the average wage level of men in comparable jobs.

In jobbing shops as well as in production establishments, women engaged as class B inspectors were the highest paid of their sex, averaging approximately one-third more than men in the base jobbing shop occupations. However, the differential between men and women class B inspectors amounted to 15 percent in favor of men. Other women workers in processing and inspecting occupations held a lower position in the wage scale than men in similar jobs, the average differential approximating 10 percent. Since city average wage rates were used in the computation of indexes, the sex differentials shown do not necessarily mean that women were paid less than men for comparable jobs in identical plants. They do indicate that in most cities women earned less than men for work of a similar character.

14/ For discussion of these factors, see "Wage Structure of the Machine Tool Accessory Industry, January 1945".

15/ Data are shown only for those occupations in which women were employed in sufficient number to justify comparisons.

INTER-CITY VARIATION IN OCCUPATIONAL WAGE RELATIONSHIPS

In table 2, indexes and actual average wage rates are presented for tool and die makers in production and jobbing shops in all of the cities included in this study. In tables 3 and 4, city indexes for other occupations are shown only for those cities in which each branch of the industry was concentrated (5 cities for production shops and 9 for jobbing shops). The list of occupations is abridged somewhat, particularly for tool and die jobbing shops in which operations were less varied than in production shops. 16/

It should be borne in mind that the earnings of workers in the base jobs in each city were of particular importance in determining the level of the indexes for other occupations. Therefore, differences among cities as revealed by the indexes do not represent differences in actual wage rates but only differences in the wage spread between occupations. 17/

City Indexes and Average Wage Rates for Tool and Die Makers

Tool and die makers occupy a key position in the industry, particularly in jobbing shops where they constitute almost a fourth of the labor force. As indicated previously, they usually appear at the top of the wage scale, outranked only by working foremen. Thus, the spread between tool and die makers and the base generally sets the limits within which other occupations are placed. In view of the numerical importance of tool and die makers and their superior position in the wage ladder, a listing of city indexes and actual hourly earnings for this occupation highlights the variation among cities in wage spread and wage rates (table 2). It will be observed, moreover, that among the cities covered little correlation existed between spread above the base and the level of money earnings.

In the production branch of the industry, tool and die makers in Albany, Newark, Pittsburgh, and Chicago held the greatest advantage in terms of spread above the base. Insofar as actual earnings were concerned, however, Detroit tool and die makers were in the best position; those in Albany were among the lowest paid in the industry.

16/ Other occupational wage data in money terms, on a locality basis, may be obtained from the Bureau upon request.

17/ To illustrate, suppose the combined average hourly earnings for the base occupations were 80 cents in City A and 90 cents in City B. Assume also that tool and die makers averaged $1.50 per hour in both cities. In City A the index for tool and die makers would be 188, or 88 percent above the base, whereas in City B the corresponding index would be 167, or 67 percent above the base.

In 8 of the 11 cities for which comparison was possible, these workers averaged higher rates of pay in jobbing than in production shops. As table 1 indicates, the spread above the base was also higher in the jobbing shops. The greatest differential between average base rates and average rates for tool and die makers was found in St. Louis jobbing shops, but the highest wages for these skilled workers were paid in Dayton, with Detroit a close second.

Occupational Wage Relationships by City

Production shops

Production shops situated in or around Chicago, Cleveland, Detroit, Hartford, and Newark employed about half of the industry's labor force in January 1945. Occupational indexes for these cities are presented in table 3. The average base rates upon which the indexes were computed are also shown.

It is apparent that the ranking of occupations varied from city to city as did the spread between each occupation and the base. Variations were widest, as expected, among the higher skilled workers. On the whole, skilled workers in Chicago showed the greatest spread above the base; none of the occupations in this class averaged less than 70 percent more than workers in the base jobs. Hartford had the smallest differential for the same groups of workers. Class B machine-tool operators in Chicago occupied higher positions in the wage ladder as compared with similar operators in other cities, while class C operators in Detroit appeared to occupy the best position. Class B and C machine workers were closest to the base in Hartford. Women plant workers fared better in relation to the base in the 3 Great Lakes cities than in Hartford or Newark.

Tool and die jobbing shops

Indexes of average wage rates for selected occupations in tool and die jobbing shops are presented in table 4 for Chicago, Cleveland, Dayton, Detroit, Hartford, Los Angeles, Milwaukee, Newark and New York. It was estimated that these 9 cities accounted for two-thirds of total employment in this branch of the industry.

As in the case of the production establishments, city indexes for the more skilled occupations exhibited a wide range among the cities shown. On the whole, the greatest spread above the base was found in Chicago, Dayton, and New York; the least spread was encountered in Detroit and Hartford.

Table 2.--CITY INDEXES AND AVERAGE WAGE RATES 1/ OF TOOL AND DIE MAKERS IN THE MACHINE TOOL ACCESSORY INDUSTRY, BY TYPE OF ESTABLISHMENT, JANUARY 1945
(Weighted average wages for male janitors and hand truckers = 100)

Region and city	Indexes		Average wage rates 1/	
	Production shops	Jobbing shops	Production shops	Jobbing shops
New England				
Boston, Massachusetts	178	194	$1.12	$1.32
Bridgeport, Connecticut	156	199	1.11	1.39
Hartford, Connecticut	167	188	1.35	1.28
New Haven, Connecticut	176	-	1.20	-
Providence, Rhode Island	189	203	1.25	1.40
Springfield, Massachusetts	-	223	-	1.45
Waterbury, Connecticut	-	177	-	1.22
Middle Atlantic				
Albany, New York	209	-	1.15	-
Buffalo, New York	-	186	-	1.32
Erie, Pennsylvania	172	-	1.17	-
Newark, New Jersey	200	203	1.50	1.48
New York, New York	185	237	1.39	1.61
Paterson, New Jersey	-	204	-	1.43
Philadelphia, Pennsylvania	-	236	-	1.65
Pittsburgh, Pennsylvania	218	211	1.48	1.33
Rochester, New York	-	223	-	1.36
Syracuse, New York	-	193	-	1.35
Great Lakes				
Chicago, Illinois	196	224	1.43	1.61
Cincinnati, Ohio	-	236	-	1.37
Cleveland, Ohio	182	203	1.42	1.52
Columbus, Ohio	-	224	-	1.30
Dayton, Ohio	-	229	-	1.79
Detroit, Michigan	173	186	1.63	1.75
Flint, Michigan	-	165	-	1.55
Fort Wayne, Indiana	-	226	-	1.54
Grand Rapids, Michigan	-	229	-	1.44
Indianapolis, Indiana	-	221	-	1.57
Milwaukee, Wisconsin	(2/)	190	(2/)	1.37
Minneapolis, Minnesota	169	212	1.20	1.38
South Bend, Indiana	-	198	-	1.64
Toledo, Ohio	-	199	-	1.47
Other				
Baltimore, Maryland	-	207	-	1.26
Los Angeles, California	-	203	-	1.62
St. Louis, Missouri	-	248	-	1.49

1/ Averages for time-workers only; do not include premium pay for overtime and night work.

2/ Number of workers insufficient to justify comparisons.

Table 3.--INDEXES OF AVERAGE WAGE RATES 1/ FOR TIME WORKERS IN SELECTED OCCUPATIONS IN MACHINE TOOL ACCESSORY PRODUCTION ESTABLISHMENTS, BY WAGE AREA, JANUARY 1945

(Weighted average wages for male janitors and hand truckers = 100)

Occupation, grade and sex	Chicago, Illinois	Cleveland, Ohio	Detroit, Michigan	Hartford, Connecticut	Newark, New Jersey
Men					
Supervision					
Working foremen, processing departments	182	164	189	162	188
Processing					
Assemblers, class A	(2/)	-	163	144	148
Assemblers, class B	(2/)	137	(2/)	117	125
Engine-lathe operators, class A	174	162	165	132	167
Engine-lathe operators, class B	147	132	139	122	135
Engine-lathe operators, class C	119	117	124	114	(2/)
Grinding-machine operators, class A	184	158	173	157	167
Grinding-machine operators, class B	148	136	139	124	136
Grinding-machine operators, class C	114	122	120	111	(2/)
Heat treaters, class B	(2/)	133	131	110	129
Milling-machine operators, class A	170	150	162	128	(2/)
Milling-machine operators, class B	149	133	136	(2/)	(2/)
Milling-machine operators, class C	116	115	121	109	(2/)
Tool and die makers	196	182	173	167	200
Turret-lathe operators, hand, (including hand-screw machines), class A	(2/)	156	155	(2/)	171
Inspection and testing					
Inspectors, class A	(2/)	159	179	153	179
Inspectors, class B	144	150	137	127	141
Inspectors, class C	114	124	(2/)	106	(2/)
Recording and control					
Stock clerks	110	122	(2/)	111	(2/)
Custodial					
Guards	121	112	(2/)	(2/)	104
Women					
Processing					
Assemblers, class C	(2/)	118	-	91	84
Drill-press operators, single and multiple spindle, class C	(2/)	113	(2/)	102	88
Engine-lathe operators, class C	(2/)	117	117	(2/)	(2/)
Grinding-machine operators, class C	127	117	115	100	96
Milling-machine operators, class C	105	110	111	101	(2/)
Inspection and testing					
Inspectors, class C	110	113	117	99	103
Custodial					
Janitors	93	94	93	(2/)	(2/)
Weighted average wages for janitors and hand truckers	$0.73	$0.78	$0.94	$0.31	$0.75

1/ Excluding premium pay for overtime and night work.
2/ Number of workers insufficient to justify comparisons.

Table 4.--INDEXES OF AVERAGE WAGE RATES 1/ FOR MEN TIME WORKERS IN SELECTED OCCUPATIONS IN TOOL AND DIE JOBBING SHOPS, BY WAGE AREA, JANUARY 1945

(Weighted average wages for janitors and hand truckers = 100)

Occupation and grade	Chicago, Illinois	Cleveland, Ohio	Dayton, Ohio	Detroit, Michigan	Hartford, Connecticut	Los Angeles, California	Milwaukee, Wisconsin	Newark, New Jersey	New York N. Y.
Supervision									
Working foremen, processing departments	231	223	259	197	210	181	210	237	275
Processing									
Engine-lathe operators, class A	197	175	194	174	168	170	178	179	184
Engine-lathe operators, class B	154	149	156	143	135	(2/)	146	134	154
Engine-lathe operators, class C	(2/)	128	(2/)	123	(2/)	(2/)	(2/)	(2/)	118
Grinding-machine operators, class A	204	184	221	189	178	163	185	173	191
Grinding-machine operators, class B	158	151	(2/)	148	149	146	150	(2/)	149
Machine-tool operators, miscellaneous machines	(2/)	163	186	143	147	148	(2/)	136	163
Machinists, production	192	184	(2/)	161	165	175	163	157	190
Milling-machine operators, class A	197	163	(2/)	172	(2/)	(2/)	172	(2/)	(2/)
Milling-machine operators, class B	142	141	(2/)	137	(2/)	(2/)	(2/)	(2/)	(2/)
Milling-machine operators, class C	119	124	(2/)	119	(2/)	(2/)	(2/)	(2/)	(2/)
Tool and die makers	224	203	229	186	188	203	190	203	237
Weighted average wages for janitors and hand truckers	$0.72	$0.75	$0.78	$0.94	$0.68	$0.80	$0.72	$0.73	$0.68

1/ Excluding premium pay for overtime and night work.

2/ Number of workers insufficient to justify comparisons.

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OCCUPATIONAL WAGE RELATIONSHIPS

SERIES I
NO. 3

FOUNDRIES

1945

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WAGE ANALYSIS BRANCH
INDUSTRY WAGE STUDIES DIVISION
HARRY OBER, CHIEF

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PREFACE

The Industry Wage Study program of the Bureau of Labor Statistics is designed to yield a variety of wage data for use in collective bargaining, wage determination, placement, and minimum wage administration.

The results of the Industry Wage Studies are made available in two series of bulletins. Series 1, entitled "Occupational Wage Relationships", provides measures of prevailing wage relationships among key occupations in each industry in terms of indexes. Series 2 on "Wage Structure" is devoted to an analysis of actual hourly earnings (straight-time) and the various elements that influence variations in wages such as location, size of establishment, methods of wage payments, and the occupational composition of each industry. This series also presents information relating to such practices as shift differential payments, paid vacations, paid lunch periods, nonproduction bonuses, insurance, sick leave, and incentive wage systems. Locality tabulations (forms OWR-17 and 18) are available in the regional offices of the Bureau.

JULY 1946

OCCUPATIONAL WAGE RELATIONSHIPS IN FOUNDRIES, JANUARY 1945 1/

INTRODUCTION

The high degree of occupational specialization characteristic of most manufacturing establishments is usually accompanied by a corresponding diversity in pay scales. The maintenance or modification of wage differentials among occupational groups in line with changing techniques and labor requirements constitute recurring problems in wage administration and collective bargaining.

In the process of setting occupational wage rates reference is generally made to prevailing rates in the labor market. Usually only a limited number of jobs (key jobs) are used as bench-marks. In some situations only the highest- and lowest-skilled jobs are used to define the limits of the wage structure; in others guide-posts are included at various points along the pay scale. Once rates are determined for the key jobs, the fixing of wages in other occupations is arrived at by comparison with the former in terms of skill, responsibility, traditionally established differentials, and other factors bearing upon wage rates. In some methods of job evaluation this process is usually aided by a systematic rating scale to determine differences between one job and another.

The Bureau's industry wage studies provide occupational wage information for key jobs only 2/--that is, jobs that are found in numerous establishments; those that engage substantial numbers of workers; and those that have been used as bench-marks in wage negotiations. It is assumed that if data for key jobs are available, rates for other occupations can be arrived at by comparison and interpolation, taking into account general similarity of job content. It is the object of the present study to analyze the extensive wage data available for foundries for the purpose of determining what central tendencies may be observed in wage differentials among occupations.

1/ Prepared by Willis C. Quant. Data were collected under the supervision of the Bureau's Regional Wage Analysts. Another bulletin, "Wage Structure: Foundries, 1945," describes the wage and occupational structure of the industry.

2/ Workers were classified on the basis of uniform job descriptions developed by the Bureau. These descriptions are available on request.

The method adopted for this purpose is as follows: in each city or wage area 3/ the average earnings of men sand mixers, hand and machine, 4/ are used as a base (100); earnings for other jobs are expressed as a percentage of that base. In this manner a ladder-like arrangement of occupational indexes for ferrous and nonferrous foundries is developed for the key jobs in each locality. In order to obtain a representative figure for all areas in each branch of the industry, the median 5/ or midpoint of an array of city indexes for a job (floor molders, for example) is selected. 6/ It is recognized, however, that some measure of variation from the median is essential in order to provide flexibility in the use of the data. For this purpose the middle range within which half of the city indexes fall is shown.

The occupational wage relationships indicated by this study constitute a background in the light of which plant policies may be formulated. Plant wage scales will differ from the city or nation-wide patterns. Despite these differences, the patterns can be of considerable use in comparing differentials between skill levels, in evaluating out-of-line rates, and in placing new jobs into the wage scale.

3/ A wage area is defined as a central city and such surrounding territory as constitutes a relatively homogeneous area with respect to wage structure. In this report the terms "wage area" and "city" are used interchangeably.
4/ The selection of hand and machine sand mixers (men) as the base was necessary because neither janitors nor hand truckers, the base jobs in other studies, were as universally represented. This change in base is of little consequence for the present study. It should, however, be kept in mind in making comparisons with data for captive foundries presented in "Occupational Wage Relationships - Machinery 1945."
5/ The median as a method of averaging is preferable to an arithmetic average in this type of analysis, since it is affected by extreme cases in a considerably lesser degree.
6/ Since the cities studied in both the ferrous and nonferrous foundries were not distributed among the various regions in the same relative proportion as the regional employment bore to the entire industry, it was desirable to weight the number of observations (city relatives) in each region in order to effect proper regional balance in arriving at the national indexes. Actually, the weighting of observations altered but few of the indexes by a significant margin.

General Wage Pattern

A comparison of the ranking of occupations in charts 1 and 2 reveals a high degree of similarity. Although the indexes for nonferrous foundries were generally higher than those for ferrous foundries, [11] the differentials or spread between occupations in the two branches of the industry were also closely comparable. There was little difference between the two series, except for the maintenance occupations (other than electricians), working foremen and class A inspectors, who appeared higher in the wage scale in the nonferrous branch, and chippers and grinders, shakeout men, power truckers and sand mixers (the base job), who held relatively better positions in ferrous foundries.

In both types of foundries, wood patternmakers ranked highest, 55 percent above the base in ferrous foundries and 70 percent above in nonferrous foundries. Watchmen were lowest in both wage scales. Machine molders held an advantage in both series over other skilled processing workers.

On the whole, city indexes varied less in nonferrous than in ferrous foundries. In both branches, the middle range within which half of the city indexes fell tended to narrow as the occupational index approached the level of the base, indicating greater inter-city variation in spread above the base among the higher skilled occupations. The extreme range for women coremakers reflects the wide inter-city differences in the nature of the job performed by women.

Method of Wage Payment and Wage Levels

Three-tenths of the plant workers in ferrous foundries and one-fifth of those in nonferrous operations were paid on a piece-rate or production-bonus basis. Because of the prominence of incentive work in this industry, and particularly in several of the cities where production is concentrated, the occupational indexes are based on data for both time and incentive workers. However, variations among occupations

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[11] The higher indexes for nonferrous foundries do not necessarily indicate a comparatively higher level of wages, because wages of the base job influence the indexes of all other occupations. An analysis of earnings of men sand mixers (the base) revealed no significant differences between the two branches. Hence, it is apparent that wage rates for comparable jobs were actually higher in nonferrous foundries in January 1945.

Table 1.--INDEXES OF AVERAGE HOURLY EARNINGS [1] IN KEY OCCUPATIONS IN FERROUS AND NONFERROUS FOUNDRIES, JANUARY 1945

(Average earnings of men sand mixers, hand and machine = 100)

Occupation, grade and sex	Ferrous foundries: Number of cities	Ferrous foundries: Median index	Ferrous foundries: Middle range within which one-half of the city indexes fell	Nonferrous foundries: Number of cities	Nonferrous foundries: Median index	Nonferrous foundries: Middle range within which one-half of the city indexes fell
Men						
Maintenance						
Carpenters, maintenance	45	112	100 - 124	22	132	127 - 135
Electricians, maintenance	43	130	111 - 141	19	139	132 - 145
Maintenance men, general utility	48	116	102 - 127	22	132	123 - 138
Mechanics, maintenance	36	116	111 - 134	15	130	121 - 142
Patternmakers, wood	48	155	134 - 163	20	170	156 - 181
Supervision						
Working foremen, processing departments	52	128	113 - 143	29	149	132 - 156
Processing						
Chippers and grinders	54	107	103 - 122	30	104	100 - 113
Coremakers, hand	54	136	131 - 145	30	144	132 - 155
Molders, hand, bench	54	137	125 - 152	30	145	129 - 155
Molders, floor	54	141	127 - 154	28	149	145 - 168
Molders, machine	52	148	136 - 159	30	153	139 - 162
Pourers, metal	45	104	97 - 109	26	113	106 - 116
Shakeout-men	54	100	95 - 105	30	98	95 - 102
Inspection						
Inspectors, class A	22	125	108 - 139	13	143	122 - 151
Inspectors, class B	30	112	101 - 123	22	120	106 - 129
Inspectors, class C	42	95	89 - 106	16	103	99 - 110
Recording and control						
Stock clerks	38	92	81 - 104	18	102	98 - 114
Material movement						
Truckers, hand	39	89	82 - 95	13	96	90 - 99
Truckers, power	31	99	92 - 105	12	101	96 - 104
Custodial						
Guards	33	91	81 - 98	16	100	95 - 103
Watchmen	49	77	70 - 84	30	83	74 - 86
Women						
Processing						
Chippers and grinders	21	95	76 - 105	18	95	87 - 103
Coremakers, hand	26	124	94 - 152	18	106	101 - 141
Inspection						
Inspectors, class C	26	82	75 - 92	17	87	79 - 100

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[1] Excluding premium pay for overtime and night work.

CHART I

INDEXES OF AVERAGE HOURLY EARNINGS OF MEN IN KEY OCCUPATIONS IN FERROUS FOUNDRIES

JANUARY 1945

AVERAGE EARNINGS OF MEN SAND MIXERS, HAND AND MACHINE = 100

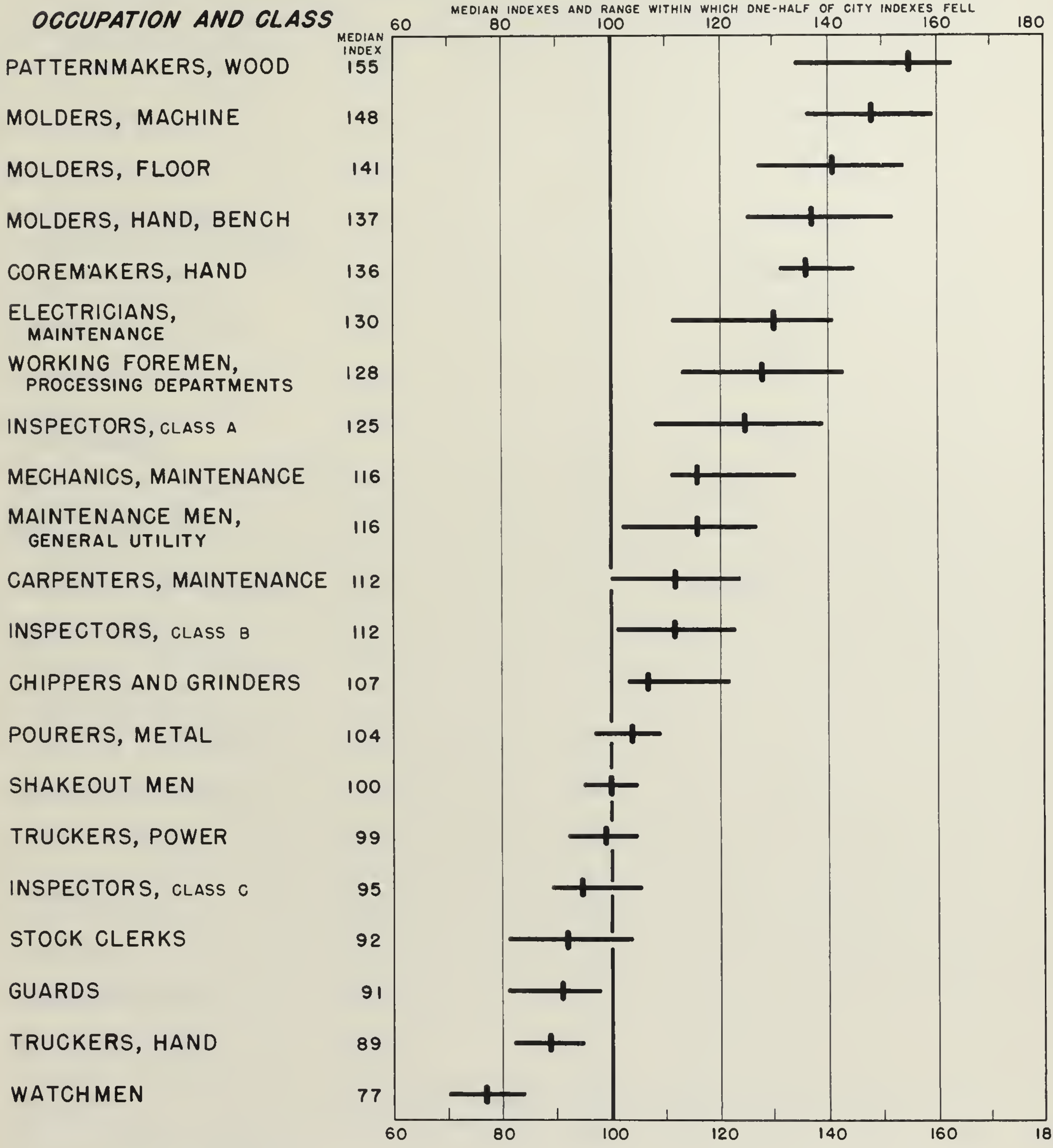

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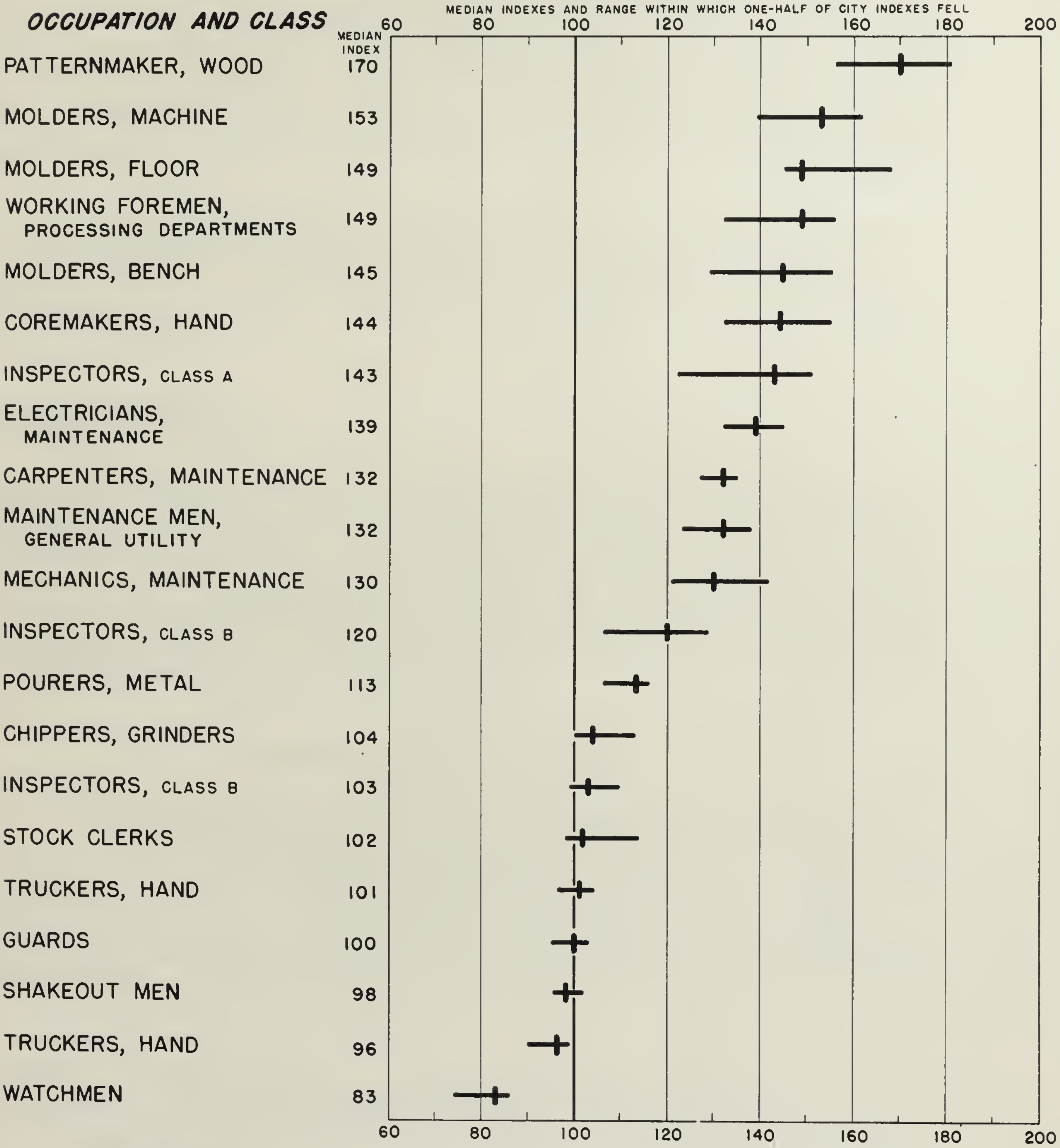
CHART 2

INDEXES OF AVERAGE HOURLY EARNINGS OF MEN IN KEY OCCUPATIONS IN NONFERROUS FOUNDRIES

JANUARY 1945

AVERAGE EARNINGS OF MEN SAND MIXERS, HAND AND MACHINE = 100



UNITED STATES DEPARTMENT OF LABOR
BUREAU OF LABOR STATISTICS

in the amount of incentive work affect wage relationships, usually to the advantage of occupations with the greatest proportion of incentive workers.[12] Under these circumstances, occupations typically paid on a time basis would appear lower in the average wage scale than might be expected in view of the skill requirements of the work.[13] Reflecting the disadvantage of time-rated occupations in January 1945, the maintenance jobs (electricians, carpenters, general utility maintenance men and mechanics), class A inspectors and, in ferrous foundries, working foremen, occupied positions in the wage scale below those of skilled processing workers such as machine molders, floor molders, bench molders and hand coremakers.

In ferrous foundries the proportion of incentive workers in processing occupations ranged from a fourth of the floor molders to about four-fifths of the machine molders. In nonferrous foundries, incentive systems covered 1 out of 6 bench molders and up to 2 out of 5 machine molders.

Wage Levels of Women

Inasmuch as the study covered women in only 3 occupations, comparison of wage levels of men and women in similar jobs is extremely limited. In both branches of the industry, however, the wage levels of men exceeded those of women by unmistakeable margins. Since the indexes were drawn from city-wide average earnings, the sex differentials do not indicate unequal pay for similar work within any given plant; they may be ascribed, in part, to inter-plant differences in job content, skill requirements, and individual productivity.

REGIONAL WAGE RELATIONSHIPS

The regional indexes for each occupation in the Northeast, South, West and the Great Lakes areas, shown in tables 2 and 3, represent the medians of all cities where the occupations were reported.[14] Nonferrous foundries in the South were omitted because of the limited coverage in that region. Because the regional medians were drawn from a small number of cities, these measures are subject to a greater margin of error than the national indexes.

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[12] However, an unusually high average wage rate in a particular city resulting from a predominance of incentive workers does not necessarily effect the median index, because this measure is not influenced by the extremes of the data.

[13] This does not imply that skill is the sole wage determinant.

[14] Differences in index levels among regions do not reflect corresponding differences in wage levels, but only differences in wage relationships

For ferrous foundries the ranking of occupations in the three regions excluding the South was, on the whole, fairly consistent. In the South, the ranking of occupations showed considerable deviation from the general pattern. The greatest differences in position were noted for patternmakers, machine molders, chippers and grinders, shakeout men, and sand mixers (the base job), who held considerably lower positions in the Southern wage scale than in the industry-wide pattern. It may be noted that the proportion of incentive workers in the South was considerably smaller than in other regions.

In nonferrous foundries the ladder-like arrangement of occupations in the North, West and Great Lakes areas showed a close similarity. Wage spreads among processing workers were narrowest in the West; in this region, incentive work was of least significance.

CITY WAGE RELATIONSHIPS

Table 4 presents occupational indexes for 20 representative cities in which nearly 40 percent of the workers in ferrous foundries were employed. In table 5 similar data are shown for 13 cities which accounted for slightly more than half of national employment in nonferrous foundries. These two tables illustrate the lack of consistency in occupational wage relationships among localities. In some cities the ranking of occupations varied markedly from the industry pattern, possibly due to differences in the proportion of incentive workers in particular occupations.

That differences in spread above the base do not correspond to differences in actual wage rates is illustrated by table 6 for ferrous foundries and by table 7 for nonferrous foundries. City indexes and actual average hourly earnings are shown for floor molders in all cities covered by this study, arranged in descending order of indexes.

Table 2.--INDEXES OF AVERAGE HOURLY EARNINGS 1/ IN KEY OCCUPATIONS IN FERROUS FOUNDRIES, BY REGION, JANUARY 1945

(Average earnings of men sand mixers, hand and machine = 100)

Occupation, grade and sex	Northeast 2/			South 3/			West 4/			Great Lakes 5/		
	Number of cities	Median index	Middle range within which one-half of the city indexes fell	Number of cities	Median index	Middle range within which one-half of the city indexes fell	Number of cities	Median index	Middle range within which one-half of the city indexes fell	Number of cities	Median index	Middle range within which one-half of the city indexes fell
Men												
Maintenance												
Carpenters, maintenance	20	116	118 - 129	8	145	128 - 170	6	122	111 - 123	11	109	100 - 118
Electricians, maintenance	15	130	122 - 138	9	165	141 - 167	7	136	135 - 138	12	114	108 - 138
Maintenance men, general utility	20	117	105 - 125	8	131	125 - 135	5	(6/)	(6/)	15	108	100 - 127
Mechanics, maintenance	14	118	110 - 127	6	153	117 - 176	6	120	115 - 135	10	115	106 - 130
Patternmakers, wood	18	143	124 - 156	9	159	151 - 196	7	161	158 - 164	14	151	121 - 158
Supervision												
Working foremen, processing departments	20	137	122 - 148	9	167	142 - 198	7	132	126 - 136	16	116	109 - 132
Processing												
Chippers and grinders	20	106	103 - 118	11	106	104 - 111	7	101	99 - 102	16	108	105 - 128
Coremakers, hand	20	136	133 - 143	11	148	138 - 150	7	133	124 - 135	16	133	128 - 142
Molders, hand, bench	20	139	128 - 147	11	159	142 - 174	7	135	125 - 137	16	129	119 - 141
Molders, floor	20	148	139 - 157	11	166	151 - 169	7	136	124 - 137	16	136	124 - 143
Molders, machine	20	155	146 - 172	10	146	125 - 156	6	143	121 - 158	16	138	136 - 152
Pourers, metal	15	102	101 - 108	9	122	96 - 126	7	100	97 - 104	14	103	97 - 106
Shakeout-men	20	101	96 - 110	11	98	96 - 105	7	95	94 - 98	16	99	94 - 101
Inspection												
Inspectors, class A	10	123	115 - 131	4	(6/)	(6/)	2	(6/)	(6/)	6	116	108 - 126
Inspectors, class B	8	117	110 - 124	4	(6/)	(6/)	6	116	100 - 123	12	109	101 - 113
Inspectors, class C	17	95	90 - 106	6	110	96 - 115	4	(6/)	(6/)	15	92	89 - 100
Recording and control												
Stock clerks	16	98	88 - 102	7	112	103 - 114	4	(6/)	(6/)	11	82	79 - 91
Material movement												
Truckers, hand	16	95	87 - 98	6	101	89 - 110	4	(6/)	(6/)	13	89	80 - 90
Truckers, power	14	100	93 - 104	2	(6/)	(6/)	2	(6/)	(6/)	13	97	90 - 101
Custodial												
Guards	12	91	88 - 96	6	108	102 - 112	4	(6/)	(6/)	11	82	81 - 95
Watchmen	13	85	77 - 87	10	79	74 - 82	7	80	79 - 84	14	73	66 - 82
Women												
Processing												
Chippers and grinders	7	92	91 - 97	5	(6/)	(6/)	2	(6/)	(6/)	7	95	76 - 105
Coremakers, hand	12	121	100 - 140	5	(6/)	(6/)	-	-	-	9	119	94 - 133
Inspection												
Inspectors, class C	11	81	77 - 91	4	(6/)	(6/)	-	-	-	11	82	75 - 92

1/ Excluding premium pay for overtime and night work.
2/ Includes cities in Connecticut, Massachusetts, New Jersey, New York, Pennsylvania, and Rhode Island.
3/ Includes cities in Alabama, Delaware, Georgia, Kentucky, Louisiana, Maryland, Oklahoma, Tennessee and Texas.
4/ Includes cities in California, Colorado, Missouri, Oregon, Utah, and Washington.
5/ Includes cities in Illinois, Indiana, Michigan, Minnesota, Ohio, and Wisconsin.
6/ Number of cities too small to justify selection of median.

Table 3.--INDEXES OF AVERAGE HOURLY EARNINGS 1/ IN KEY OCCUPATIONS IN NONFERROUS FOUNDRIES, BY REGION, JANUARY 1945

(Average earnings of men sand mixers, hand and machine = 100)

Occupation, grade and sex	Northeast 2/			West 3/			Great Lakes 4/		
	Number of cities	Median index	Middle range within which one-half of the city indexes fell	Number of cities	Median index	Middle range within which one-half of the city indexes fell	Number of cities	Median index	Middle range within which one-half of the city indexes fell
Men									
Maintenance									
Carpenters, maintenance	9	132	128 - 141	4	(5/)	(5/)	7	129	127 - 134
Electricians, maintenance	9	139	128 - 145	2	(5/)	(5/)	7	135	133 - 142
Maintenance men, general utility	8	131	124 - 138	5	(5/)	(5/)	9	132	123 - 135
Mechanics, maintenance	7	128	122 - 151	3	(5/)	(5/)	4	(5/)	(5/)
Patternmakers, wood	7	177	156 - 180	4	(5/)	(5/)	7	168	156 - 175
Supervision									
Working foremen, processing departments	11	155	143 - 158	7	152	146 - 155	9	143	132 - 151
Processing									
Chippers and grinders	11	105	100 - 111	7	106	104 - 106	10	106	98 - 115
Coremakers, hand	11	144	139 - 156	7	132	132 - 136	10	148	135 - 155
Molders, hand, bench	11	151	143 - 163	7	140	138 - 144	10	144	126 - 147
Molders, floor	11	147	145 - 159	7	140	140 - 141	8	155	149 - 168
Molders, machine	11	154	140 - 155	7	141	140 - 144	10	157	147 - 176
Pourers, metal	9	114	111 - 119	6	109	100 - 112	9	113	105 - 115
Shakeout-men	11	97	93 - 102	7	100	99 - 100	10	99	95 - 105
Inspection									
Inspectors, class A	4	(5/)	(5/)	2	(5/)	(5/)	6	142	122 - 151
Inspectors, class B	10	117	102 - 128	4	(5/)	(5/)	7	117	112 - 120
Inspectors, class C	6	100	92 - 103	3	(5/)	(5/)	6	108	102 - 114
Recording and control									
Stock clerks	7	100	99 - 102	3	(5/)	(5/)	8	103	98 - 108
Custodial									
Guards	6	87	84 - 98	4	(5/)	(5/)	5	(5/)	(5/)
Watchmen	11	80	74 - 85	7	83	73 - 90	10	85	82 - 87
Women									
Processing									
Chippers and grinders	8	93	90 - 103	1	(5/)	(5/)	8	97	86 - 101
Coremakers, hand	8	113	103 - 139	3	(5/)	(5/)	6	103	96 - 133
Inspection									
Inspectors, class C	8	86	84 - 91	2	(5/)	(5/)	6	91	69 - 103

1/ Excluding premium pay for overtime and night work.
2/ Includes cities in Connecticut, Massachusetts, New Jersey, New York, and Pennsylvania.
3/ Includes cities in California, Colorado, Missouri, Oregon, and Washington.
4/ Includes cities in Illinois, Indiana, Michigan, Minnesota, Ohio, and Wisconsin.
5/ Number of cities too small to justify selection of median.

Table 4.--INDEXES OF AVERAGE HOURLY EARNINGS 1/ OF MEN IN KEY OCCUPATIONS IN FERROUS FOUNDRIES, BY CITY, JANUARY 1945

(Average earnings of men sand mixers, hand and machine = 100)

Occupation and grade	Northeast					South	West		Great Lakes											
	Boston, Mass.	Buffalo, N.Y.	Philadelphia, Pa.	Pittsburgh, Pa.	Waterbury, Conn.	Chattanooga, Tenn.	Los Angeles, Calif.	Seattle, Wash.	Canton, Ohio	Chicago, Ill.	Cincinnati, Ohio	Cleveland, Ohio	Columbus, Ohio	Dayton, Ohio	Detroit, Mich.	Indianapolis, Ind.	Milwaukee, Wis.	Minneapolis, Minn.	South bend, Ind.	Toledo, Ohio
Maintenance																				
Carpenters, maintenance	(2/)	112	135	114	107	(2/)	109	121	129	124	-	96	(2/)	-	112	92	(2/)	(2/)	-	(2/)
Electricians, maintenance	135	122	138	128	(2/)	166	(2/)	121	138	122	-	100	108	111	117	(2/)	108	(2/)	(2/)	143
Maintenance men, general utility	(2/)	121	125	125	(2/)	(2/)	126	111	123	118	(2/)	97	(2/)	(2/)	127	95	102	116	98	-
Mechanics, maintenance	-	111	138	127	(2/)	(2/)	122	(2/)	-	(2/)	130	106	103	(2/)	115	106	93	(2/)	-	137
Patternmakers, wood	142	146	172	163	126	151	158	161	162	167	(2/)	147	104	119	134	157	121	(2/)	-	(2/)
Supervision																				
Working foremen, processing departments	141	130	137	148	101	(2/)	132	126	143	128	(2/)	113	118	98	123	108	108	132	103	157
Processing																				
Chippers and grinders	105	118	132	117	106	105	99	102	133	130	108	105	107	96	128	115	128	106	96	153
Coremakers, hand	(2/)	133	177	136	133	149	133	124	138	153	152	139	131	(2/)	135	115	142	128	116	176
Molders, hand, bench	144	133	156	139	116	161	135	125	-	141	152	119	113	137	127	115	146	130	128	162
Molders, floor	144	139	157	135	130	166	137	124	144	141	153	127	114	121	139	124	143	132	121	147
Molders, machine	145	153	160	147	132	156	159	110	137	161	170	136	136	127	148	125	159	123	138	200
Pourers, metal	(2/)	119	107	125	(2/)	84	92	97	106	109	(2/)	96	(2/)	93	97	107	101	105	(2/)	(2/)
Shakeout-men	96	114	98	106	109	98	89	94	94	100	99	93	112	93	98	86	99	100	99	101
Inspection																				
Inspectors, class B	-	112	135	124	(2/)	(2/)	(2/)	123	(2/)	110	(2/)	91	93	112	105	(2/)	-	-	-	120
Inspectors, class C	-	94	120	106	95	(2/)	(2/)	-	90	110	92	82	(2/)	95	92	140	98	(2/)	79	102
Material movement																				
Truckers, hand	100	96	(2/)	(2/)	80	89	(2/)	97	89	(2/)	91	80	81	79	89	89	82	(2/)	(2/)	(2/)
Truckers, power	106	93	(2/)	(2/)	86	100	-	104	101	(2/)	(2/)	90	74	84	92	(2/)	(2/)	(2/)	-	105
Custodial																				
Guards	96	(2/)	106	107	(2/)	107	(2/)	85	91	98	(2/)	78	72	81	-	(2/)	82	(2/)	-	110
Watchmen	78	81	86	96	77	77	(2/)	(2/)	(2/)	(2/)	(2/)	64	(2/)	66	73	71	77	82	65	(2/)
Average hourly earnings 1/ of men sand mixers, hand and machine	$0.78	$0.90	$0.81	$0.83	$0.88	$0.61	$0.95	$1.01	$0.87	$0.88	$0.79	$1.09	$1.04	$1.08	$1.06	$0.97	$0.90	$0.82	$1.05	$0.86

1/ Excluding premium pay for overtime and night work.

2/ Number of workers too small to justify comparisons.

Table 5.--INDEXES OF AVERAGE HOURLY EARNINGS 1/ OF MEN IN KEY OCCUPATIONS IN NONFERROUS FOUNDRIES, BY CITY, JANUARY 1945

(Average earnings of men sand mixers, hand and machine = 100)

Occupation and grade	Northeast					South	West	Great Lakes					
	Boston, Mass.	Buffalo, N.Y.	Newark, N.J.	Philadelphia, Pa.	Pittsburgh, Pa.	Birmingham, Ala.	Los Angeles, Calif.	Chicago, Ill.	Cincinnati, Ohio	Cleveland, Ohio	Detroit, Mich.	Milwaukee, Wis.	Minneapolis, Minn.
Maintenance													
Carpenters, maintenance	(2/)	103	(2/)	-	147	(2/)	131	134	(2/)	(2/)	(2/)	111	(2/)
Electricians, maintenance	(2/)	112	(2/)	(2/)	(2/)	-	135	142	142	133	(2/)	132	-
Maintenance men, general utility	(2/)	109	(2/)	136	-	-	124	133	139	123	(2/)	126	(2/)
Mechanics, maintenance	(2/)	106	(2/)	(2/)	(2/)	-	120	142	-	130	103	121	-
Patternmakers, wood	(2/)	(2/)	(2/)	-	181	(2/)	168	201	175	168	-	136	156
Supervision													
Working foremen, processing departments	156	129	162	155	168	(2/)	134	153	143	132	(2/)	126	149
Processing													
Chippers and grinders	111	100	105	113	128	102	106	101	113	132	98	118	115
Coremakers, hand	144	120	156	154	164	135	132	155	158	167	113	151	142
Molders, hand, bench	145	119	151	163	171	169	140	145	161	146	109	126	130
Molders, floor	145	145	159	178	190	148	140	149	(2/)	182	109	160	-
Molders, machine	155	125	140	154	175	178	141	178	184	157	99	162	147
Pourers, metal	130	115	119	114	-	(2/)	112	112	105	131	95	(2/)	113
Shakeout men	(2/)	90	105	104	97	(2/)	97	108	95	110	92	97	105
Inspection													
Inspectors, class B	(2/)	(2/)	(2/)	(2/)	129	-	111	112	96	129	117	(2/)	(2/)
Inspectors, class C	-	107	-	103	100	-	99	112	84	114	102	119	-
Custodial													
Guards	(2/)	79	-	90	-	-	95	99	(2/)	103	-	-	(2/)
Watchmen	(2/)	(2/)	86	65	89	(2/)	(2/)	84	(2/)	(2/)	(2/)	86	(2/)
Average hourly earnings 1/ of men sand mixers, hand and machine	$0.80	$0.99	$0.81	$0.78	$0.72	$0.65	$0.95	$0.83	$0.76	$0.87	$1.26	$0.91	$0.79

1/ Excluding premium pay for overtime and night work.
2/ Number of workers too small to justify comparisons.

Table 6.--CITY INDEXES AND AVERAGE HOURLY EARNINGS 1/ OF FLOOR MOLDERS IN FERROUS FOUNDRIES, JANUARY 1945

(Average earnings of men sand mixers, hand and machine = 100)

City	Index	Average hourly earnings 1/	City	Index	Average hourly earnings 1/
Atlanta, Ga.	188	$1.07	Denver, Colo.	141	$1.04
New Orleans, La.	181	1.21	Fort Wayne, Ind.	141	1.17
Houston, Texas	176	1.16	Bridgeport, Conn.	140	1.01
Worcester, Mass.	176	1.41	Tulsa, Okla.	140	1.08
New Haven, Conn.	170	1.43	Buffalo, N. Y.	139	1.25
Birmingham, Ala.	169	.83	Detroit, Mich.	139	1.47
Chattanooga, Tenn.	166	1.01	Erie, Pa.	139	1.18
Fort Worth, Texas	166	1.01	Los Angeles, Calif.	137	1.30
Paterson, N. J.	166	1.36	San Francisco, Calif.	136	1.29
Newark, N. J.	161	1.22	Pittsburgh, Pa.	135	1.12
Akron, Ohio	160	1.30	Minneapolis, Minn.	132	1.08
Baltimore, Md.	158	1.17	Waterbury, Conn.	130	1.14
Louisville, Ky.	158	1.04	Grand Rapids, Mich.	128	1.09
New York, N. Y.	157	1.24	Cleveland, Ohio	127	1.38
Philadelphia, Pa.	157	1.27	Wilmington, Del.	127	1.12
Reading, Pa.	155	1.19	Indianapolis, Ind.	124	1.20
Albany, N. Y.	153	1.21	Salt Lake City, Utah	124	1.05
Cincinnati, Ohio	153	1.21	Seattle, Wash.	124	1.25
Hartford, Conn.	150	1.14	Dayton, Ohio	121	1.31
Syracuse, N. Y.	149	1.16	Portland, Ore.	121	1.27
Toledo, Ohio	147	1.26	South Bend, Ind.	121	1.27
Springfield, Mass.	146	1.11	Providence, R. I.	118	1.07
Boston, Mass.	144	1.12	Fall River, Mass.	116	1.08
Canton, Ohio	144	1.25	Columbus, Ohio	114	1.19
Milwaukee, Wis.	143	1.29	Utica, N. Y.	107	1.04
San Antonio, Texas	142	.91	Kansas City, Mo.	(2/)	(2/)
Chicago, Ill.	141	1.24	Peoria, Ill.	(2/)	(2/)

1/ Excluding premium pay for overtime and night work.
2/ Number of workers too small to justify comparisons.

Table 7.--CITY INDEXES AND AVERAGE HOURLY EARNINGS 1/ OF FLOOR MOLDERS IN NONFERROUS FOUNDRIES JANUARY 1945

(Average earnings of men sand mixers, hand and machine = 100)

City	Index	Average hourly earnings 1/
Pittsburgh, Pa.	190	$1.37
Cleveland, Ohio	182	1.58
Indianapolis, Ind.	180	1.33
Philadelphia, Pa.	178	1.39
New York, N. Y.	168	1.38
Milwaukee, Wis.	160	1.46
Newark, N. J.	159	1.29
Syracuse, N. Y.	158	1.23
Baltimore, Md.	153	1.21
Chicago, Ill.	149	1.24
Denver, Colo.	149	1.12
Youngstown, Ohio	149	1.24
Birmingham, Ala.	148	.96
Springfield, Mass.	147	1.31
Boston, Mass.	145	1.16
Buffalo, N. Y.	145	1.44
Los Angeles, Calif.	140	1.33
San Francisco, Calif.	140	1.37
Seattle, Wash.	132	1.28
Rochester, N. Y.	131	1.10
New Haven, Conn.	123	1.11
Detroit, Mich.	109	1.37
Cincinnati, Ohio	(2/)	(2/)
Kansas City, Mo.	(2/)	(2/)
Minneapolis, Minn.	(2/)	(2/)
Peoria, Ill.	(2/)	(2/)
Portland, Ore.	(2/)	(2/)
Reading, Pa.	(2/)	(2/)
St. Louis, Mo.	(2/)	(2/)
South Bend, Ind.	(2/)	(2/)

1/ Excluding premium pay for overtime and night work.
2/ Number of workers too small to justify comparisons.

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Industrial Chemicals, 1946
Limited Price Variety Stores, 1945
Power Laundries, 1945
Radios, 1945
Structural Clay Products, 1945
Warehousing, 1945
Wood Furniture, 1945

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OCCUPATIONAL WAGE RELATIONSHIPS

SERIES I
NO. 4

MACHINE TOOLS

1945

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BUREAU OF LABOR STATISTICS

WAGE ANALYSIS BRANCH
INDUSTRY WAGE STUDIES DIVISION
HARRY OBER, CHIEF

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PREFACE

The Industry Wage Study program of the Bureau of Labor Statistics is designed to yield a variety of wage data for use in collective bargaining, wage determination, placement, and minimum wage administration.

The results of the Industry Wage Studies are made available in two series of bulletins. Series 1, entitled "Occupational Wage Relationships", provides measures of prevailing wage relationships among key occupations in each industry in terms of indexes. Series 2 on "Wage Structure" is devoted to an analysis of actual hourly earnings (straight-time) and the various elements that influence variations in wages such as location, size of establishment, methods of wage payments, and the occupational composition of each industry. This series also presents information relating to such practices as shift differential payments, paid vacations, paid lunch periods, nonproduction bonuses, insurance, sick leave, and incentive wage systems. Locality tabulations (forms OWR-17 and 18) are available in the regional offices of the Bureau.

JULY 1946

OCCUPATIONAL WAGE RELATIONSHIPS IN THE MACHINE TOOL INDUSTRY, JANUARY 1945 [1]

INTRODUCTION

The high degree of occupational specialization characteristic of most manufacturing establishments is usually accompanied by a corresponding diversity in pay scales. The maintenance or modification of wage differentials among occupational groups in line with changing techniques and labor requirements constitute recurring problems in wage administration and collective bargaining.

In the process of setting occupational wage rates, reference is generally made to prevailing rates in the labor market. Usually only a limited number of jobs (key jobs) are used as bench-marks. In some situations only the highest - and lowest-skilled jobs are used to define the limits of the wage structure; in others guide-posts are included at various points along the pay scale. Once rates are determined for the key jobs, the fixing of rates for other occupations is achieved by comparison with the former in terms of skill, responsibility, traditionally established differentials, and other factors bearing upon wage rates. In some methods of job evaluation this process is usually aided by a systematic rating scale to determine differences between one job and another.

The Bureau's industry wage studies provide occupational wage information for key jobs only [2] -- that is, jobs that are found in numerous establishments; those that engage substantial numbers of workers; and those that have been used as bench-marks in wage negotiations. It is assumed that if data for key jobs are available, rates for other occupations can be arrived at by comparison and interpolation, taking into account general similarity of job content.

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[1] This report was prepared by Edyth M. Bunn. Data were obtained through an industry wage survey conducted under the direction of the Regional Wage Analysts of the Bureau. A previous bulletin, "Wage Structure: Machine Tools, 1945", described the wage and occupational structure of the industry.

[2] Job descriptions are available on request.

It is the object of the present study to analyze the extensive wage data available for the machine tool industry for the purpose of determining what central tendencies may be observed in wage differentials among occupations.

The method adopted for this purpose is as follows: in each city or wage area 3/ the combined average time rates of two unskilled jobs, men janitors and hand truckers, are used as a base (100); average hourly earnings for other occupations (time and incentive workers separated) are expressed as a percentage of that base. In this manner, a ladder-like arrangement of occupational indexes, by method of wage payment, is developed for the key jobs in each locality in which machine tool plants are concentrated. In order to obtain a representative figure for all areas in the industry, the city indexes for each occupation are ranked and an average of the middle 50 percent of the indexes is computed. 4/ The limits to the middle range within which half the city indexes fall are also shown in order to provide flexibility in the use of the data.

The occupational wage relationships indicated by this study constitute a background in the light of which plant policies may be formulated. Plant wage scales will in many cases differ widely from the city or nationwide patterns. Despite these differences the patterns can be of considerable use in comparing differentials between skill levels, in evaluating out-of-line rates, and in placing new jobs into the wage scale.

3/ A wage area is defined as a central city and such surrounding territory as constitutes a relatively homogeneous area with respect to wage structure. In this report the terms "wage area" and "city" are used interchangeably.

4/ Averaging the middle range of indexes represents a departure from the method employed in previous wage relationship studies. Heretofore, the median of all city indexes was selected as the national average. With a wide range in index values and a relatively small number of cities the median tends to be unstable, that is, subject to significant change merely by the addition or subtraction of one or two city indexes, not necessarily extreme values. The average of the middle range and the median have in common a characteristic desirable for this type of data, namely, that of eliminating the effect of extreme cases.

NATION-WIDE WAGE RELATIONSHIPS 5/

The machine tool industry includes all establishments primarily engaged in the manufacture of non-portable power-driven machines such as lathes, milling machines, planers, shapers, boring mills, drill presses and machines for honing, lapping and grinding. In January 1945, the industry consisted of approximately 300 establishments employing over 100,000 workers. About two-thirds of the industry's labor force were employed in establishments situated in or near 17 large cities. 6/ Information for this study was based upon January 1945 pay-roll data 7/ obtained from 129 representative establishments employing 62,000 workers in these cities.

The wage data cover men in 42 jobs and women in 9 jobs. Indexes are presented separately for workers paid on an incentive basis (piece rate or production bonus), who were represented in 10 of the 17 cities covered. Because of interplant differences in occupational structure, few of the time- or incentive-paid jobs were found in all cities.

5/ Occupational wage rates in money terms are the subject of another report, "Wage Structure: Machine Tools, 1945". The use of that report to supplement the data in the present study is recommended. It should be noted, however, that the two reports covering the machine tool industry differ significantly with respect to purpose, coverage, and method; hence, the wage relationships indicated in this study will not coincide with relationships between industry-wide occupational average earnings.

6/ The cities covered were: New England - Boston and Worcester, Massachusetts; Bridgeport and Hartford, Connecticut; Providence, Rhode Island; Middle Atlantic - Buffalo and New York City, New York; Philadelphia, Pennsylvania; Great Lakes - Chicago and Rockford, Illinois; Cincinnati, Cleveland and Toledo, Ohio; Detroit, Michigan; Minneapolis, Minnesota; Midwest - St. Louis, Missouri; Pacific - Los Angeles, California.

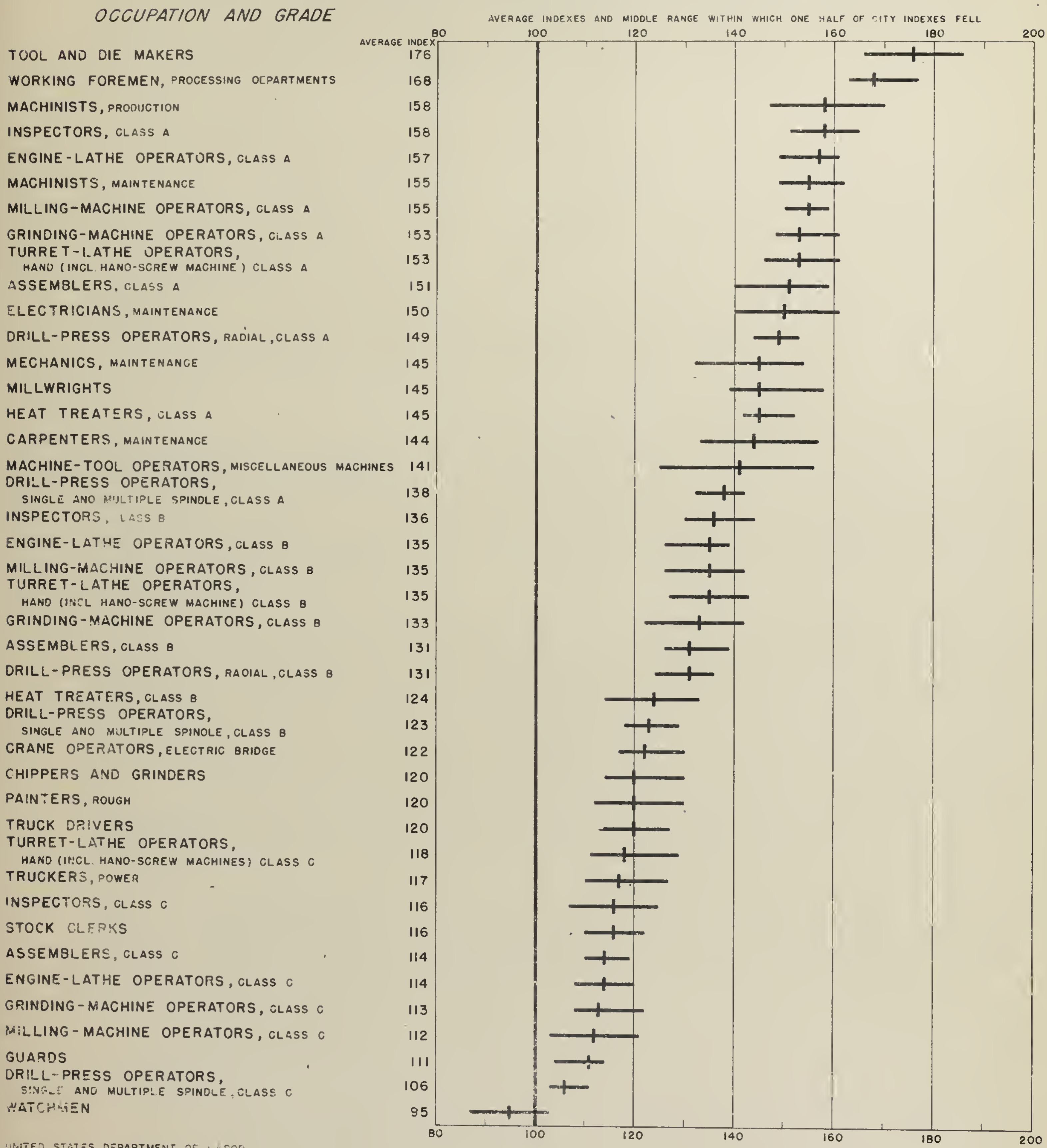
7/ Wage rates have not been static since January 1945. In some cases increases have been granted in the form of percentages, while in others increases have involved a specified number of cents per hour. When applied to all or most workers a percentage change does not affect the differentials between occupations nor their relative positions in the wage scale. Although the second type of wage increase narrows the differentials between occupations, it does not otherwise change the wage scale. Over a period of time, however, the relationships between time rates and the earning of workers paid according to individual or group productivity may be altered by factors other than wage changes. For example, the standardization of product, allowing for long runs for machine operators on incentive, often results in a substantial increase in earnings.

CHART 1

INDEXES OF AVERAGE WAGE RATES FOR MEN TIME WORKERS IN KEY OCCUPATIONS IN MACHINE TOOL INDUSTRY

JANUARY 1945

COMBINED AVERAGE WAGES FOR JANITORS AND HAND TRUCKERS = 100



UNITED STATES DEPARTMENT OF LABOR
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Wage Levels of Women

Among women workers, class C turret-lathe operators and class B inspectors ranked highest, earning close to 20 percent above the base. Comparison of wage levels between men and women can be made in only a limited number of occupations; in the 8 occupations in which such comparison is possible, the wage level was approximately the same in only 2 instances, class C drill-press and turret-lathe operators. The average wage-area differential in favor of men was about 10 percent. 10/

Relationships Among Incentive Workers.

In January 1945 more than a fourth of the industry's plant workers were paid on an incentive basis. The occupations most commonly found under piece-rate or production bonus systems were the specialized machine-tool jobs, assembling, and chipping and grinding. Average indexes and middle ranges for these occupations are shown in table 2. In chart 2, average indexes of time and incentive workers in identical jobs are compared. Since both series were computed from the same base (city average earnings of janitors and hand truckers) the differences in index values represent differences in wage levels as well as spread above the base.

In terms of wage relationships, the pattern formed by incentive-paid occupations bears a close resemblance to that for time workers. When the ranking of occupations is considered, it is observed that for both time and incentive workers the first 6 positions cover class A machine operators, the next 7 positions represent B workers, and chippers and grinders and class C workers occupy the lower positions. However, the ranking within these three main groups differs somewhat as between time and incentive workers.

An examination of the data reveals that differentials between skill levels are not significantly affected by method of wage payment. For example, in most of the categories the advantages of A workers over B workers ranged only from 11 to 16 percent for both incentive and time workers. In a comparison between grades B and C less uniformity is to be expected since in the lower-skilled jobs individual dexterity is given greater scope, hence incentive earnings are inclined to be more erratic. Even here, however, the average differential between grades B and C varied only from 14 percent for incentive to 17 percent for time workers, with a range of 11 to 18 percent covering most of the occupations in both groups.

10/ These data cannot support any conclusions regarding intra-plant wage differentials between men and women performing jobs of similar character.

As chart 2 indicates, incentive earnings exceeded hourly rates in all occupations studied. The differentials ranged from 8 percent for class A engine-lathe operators to 30 percent for class A single-and multiple-drill-press operators. The average differential in favor of incentive workers was 17 percent. A significant consequence of differences in methods of wage payment was to bring the earnings of class C workers on incentive up to the level of class B workers on time rates, while the earnings of class B men in the former category generally were at the level of the highest-skilled machine-tool operators paid on a time basis.

INTER-CITY VARIATION IN WAGE RELATIONSHIPS [11]

In January 1945, 40 percent of the machine-tool establishments and over half of the industry's workers were concentrated in or near the cities of Bridgeport, Providence, Worcester, New York, Cincinnati, Cleveland, Detroit, Rockford, and Los Angeles. Table 3 presents occupational indexes for these cities, together with the combined rate for janitors and hand truckers used as the base in arriving at the city indexes. It should be noted that inter-city differences in index levels do not reflect corresponding differences in wage levels, except in instances where the combined rates of the base occupation are similar.

The differences in spread between the highest paid occupation, tool and die makers, and the lowest, the base occupations, highlight the variations in inter-city wage relationships. In Bridgeport, average earnings of tool and die makers were more than twice those of the base jobs; as a contrast, the spread in Worcester amounted to approximately 50 percent.

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[11] Occupational wage data in money terms, on a locality basis, may be obtained from the Bureau on request.

Table 2.--INDEXES OF AVERAGE HOURLY EARNINGS 1/ FOR MEN INCENTIVE WORKERS IN SELECTED OCCUPATIONS IN MACHINE TOOL INDUSTRY, JANUARY 1945

(Combined average wages for janitors and hand truckers = 100)

Occupation and grade	Number of cities	Average of middle index range	Middle range within which one-half of the city indexes fell
Assemblers, class A	10	177	168 - 190
Assemblers, class B	8	160	146 - 164
Assemblers, class C	9	140	125 - 155
Chippers and grinders	9	141	126 - 153
Drill-press operators, radial, class B	10	150	144 - 157
Drill-press operators, single and multiple spindle, class A	7	179	165 - 189
Drill-press operators, single and multiple spindle, class B	7	151	143 - 162
Drill-press operators, single and multiple spindle, class C	6	131	120 - 149
Engine-lathe operators, class A	9	169	159 - 184
Engine-lathe operators, class B	9	152	145 - 160
Engine-lathe operators, class C	7	125	119 - 134
Grinding-machine operators, class A	10	180	166 - 203
Grinding-machine operators, class B	8	156	151 - 164
Grinding-machine operators, class C	9	140	129 - 156
Milling-machine operators, class A	9	169	159 - 186
Milling-machine operators, class B	9	149	139 - 161
Milling-machine operators, class C	8	137	125 - 160
Turret-lathe operators, hand (including hand-screw machine) class A	10	174	162 - 201
Turret-lathe operators, hand (including hand-screw machine) class B	10	154	150 - 162
Turret-lathe operators, hand (including hand-screw machine) class C	9	135	128 - 142

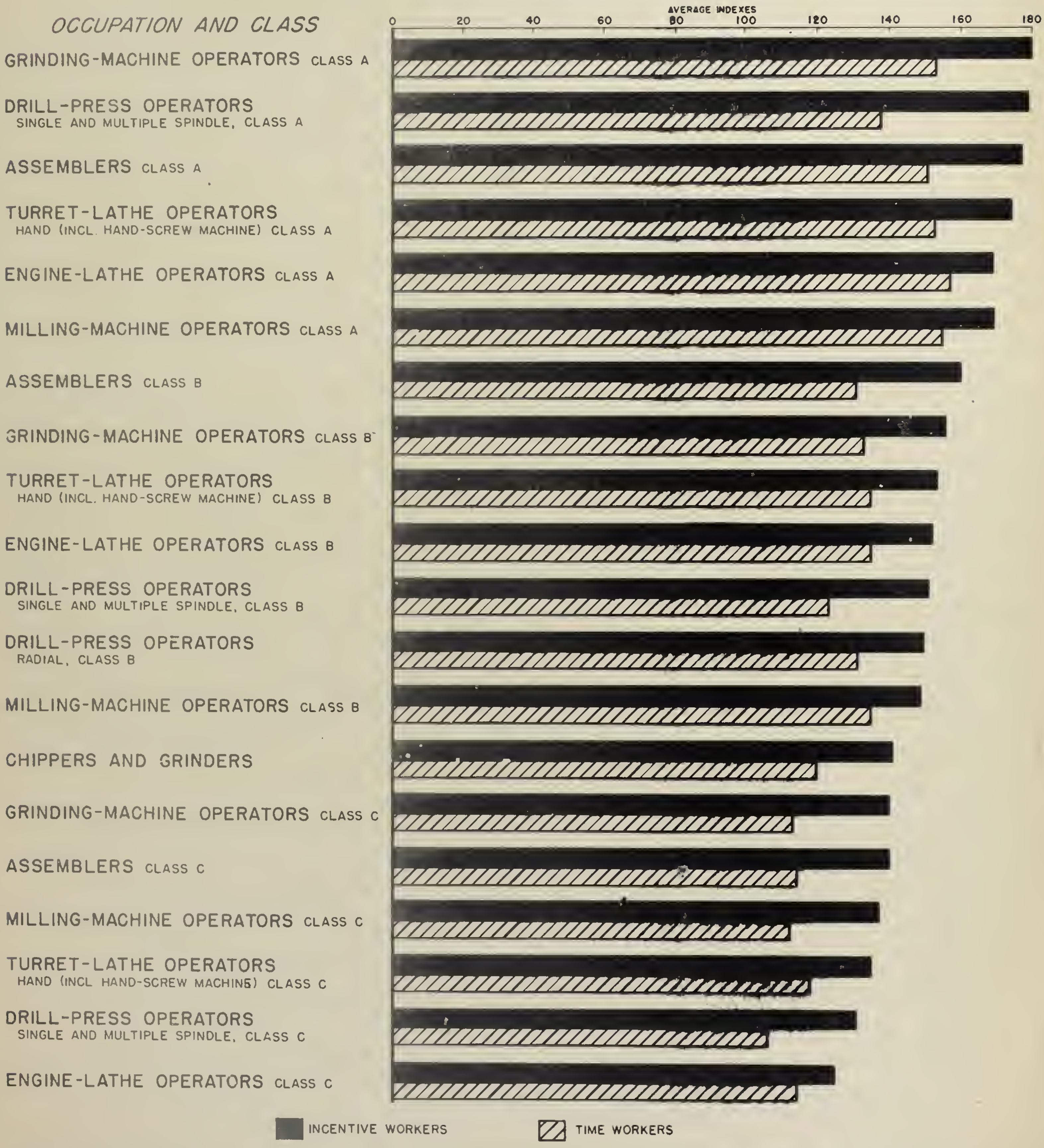
1/ Excluding premium pay for overtime and night work.

CHART 2

INFLUENCE OF METHOD OF WAGE PAYMENT ON OCCUPATIONAL WAGE RELATIONSHIPS IN MACHINE TOOL INDUSTRY

JANUARY 1945

COMBINED AVERAGE WAGES FOR JANITORS AND HAND TRUCKERS = 100



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[1] BASED ON STRAIGHT-TIME HOURLY EARNINGS OF MEN.

Table 3.—INDEXES OF AVERAGE WAGE RATES 1/ FOR MEN TIME WORKERS IN SELECTED OCCUPATIONS IN MACHINE TOOL ESTABLISHMENTS, BY WAGE AREA, JANUARY 1945

(Combined average wage for janitors and hand truckers = 100)

Occupation and grade	Bridgeport, Conn.	Providence, R. I.	Worcester, Mass.	New York, N. Y.	Cincinnati, Ohio	Cleveland, Ohio	Detroit, Mich.	Rockford, Ill.	Los Angeles, Calif.
Maintenance									
Carpenters, maintenance	(2/)	140	132	(2/)	(2/)	135	131	129	(2/)
Electricians, maintenance	(2/)	143	140	166	168	136	160	137	167
Machinists, maintenance	-	154	139	154	-	123	169	149	165
Mechanics, maintenance	(2/)	(2/)	-	153	(2/)	140	152	129	-
Millwrights	-	139	129	(2/)	171	135	141	122	-
Supervision									
Working foremen, processing departments	168	(2/)	149	(2/)	154	177	164	163	170
Processing									
Assemblers, class A	153	(2/)	140	157	139	140	159	147	161
Assemblers, class B	135	146	119	129	126	120	130	128	130
Assemblers, class C	(2/)	129	118	(2/)	106	102	(2/)	113	(2/)
Drill-press operators, radial, class A	(2/)	(2/)	(2/)	146	(2/)	127	161	144	(2/)
Drill-press operators, radial, class B	(2/)	136	(2/)	124	126	112	123	(2/)	(2/)
Engine-lathe operators, class A	157	161	133	156	141	137	164	149	161
Engine-lathe operators, class B	139	144	129	129	126	121	(2/)	124	139
Grinding-machine operators, class A	149	(2/)	(2/)	144	(2/)	134	169	146	162
Grinding-machine operators, class B	142	(2/)	(2/)	119	122	119	145	125	142
Machine-tool operators, miscellaneous machines	(2/)	(2/)	146	120	-	(2/)	159	134	-
Machinists, production	150	170	146	159	-	-	(2/)	147	170
Milling-machine operators, class A	158	(2/)	(2/)	139	138	138	160	150	159
Milling-machine operators, class B	140	(2/)	(2/)	(2/)	125	118	132	(2/)	(2/)
Tool and die makers	215	170	151	167	165	164	176	166	182
Turret-lathe operators, hand (including hand-screw machine) class A	160	(2/)	(2/)	143	141	140	167	146	158
Turret-lathe operators, hand (including hand-screw machine) class B	143	(2/)	(2/)	132	126	121	(2/)	(2/)	138
Inspection									
Inspectors, class A	(2/)	151	153	163	158	137	167	149	165
Inspectors, class B	(2/)	129	132	132	139	123	134	122	142
Inspectors, class C	(2/)	107	(2/)	-	116	(2/)	(2/)	104	128
Recording and Control									
Stock clerks	(2/)	113	114	105	107	107	(2/)	110	127
Material Movement									
Truck drivers	(2/)	127	118	(2/)	(2/)	102	122	118	(2/)
Custodial									
Guards	(2/)	103	114	115	116	104	(2/)	103	116
Combined average wage 1/ for janitors and hand truckers	$0.72	$0.70	$0.72	$0.79	$0.69	$0.91	$0.94	$0.68	$0.79

1/ Excluding premium pay for overtime and night work.

2/ Number of workers too small to justify comparisons.

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